THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

$2.00 A COPY; $44/YEAR | JULY 15, 1985 | VOL. XIX, NO. 28

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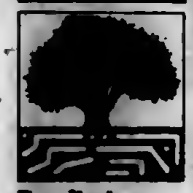

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NEWSPAPER

Datapro survey: Strong demand for mainframes

By Tom Hustad
CW Staff

DELRAN, N.J. — For mainframe users, last year was time to replace aging processors with newer technology systems.

A recent survey of 637 mainframe users, conducted by Datapro Research Corp. here, revealed that most respondents had installed new mainframes in the past year. The survey asked users how long their current mainframes had been installed. On the average, the users' responses indicated that time period to be less than 10 months.

Of the group polled, users of National Advanced Systems Corp. mainframes made the most recent additions to their shops; NAS' systems were an average of 6.2 months old. Sperry Corp. mainframes ranked as veterans, with an average system age of 10.7 months. Users of other vendors' systems had similar responses, with Burroughs Corp. users responding 9.6 months, Honeywell, Inc. users 8.7 months, IBM users 9.3 months and NCR Corp. users 9.9 months. A catchall group of other mainframes posted an average system age of 12.9 months, Datapro said.

Missing from the survey were Control Data Corp. and IPL Systems, Inc. A Datapro spokeswoman said that of the 6,000 mainframe users who were sent questionnaires, CDC and IPL users failed to submit the five required responses. Furthermore, she said, Digital Equipment Corp.'s Decsystem line and the now-defunct firm, Magnuson Computer Systems, Inc., were eliminated from the 1985 survey.

Highlights of the Datapro survey include the following:

■ On the average, more users chose to

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Boeing Computer Services is creating an office net architecture that is modeled after standards and is aimed at facilitating communications. Page 11.

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Never again. The IRS is taking steps to correct the snafus that plagued computerized tax return processing this year. Page 11.

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Cincom will expand its applications line with a new release of its manufacturing system and other tools. Page 12.

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The men who ministaturized DEC's VAX architecture relate the agonies and the ecstasies of their three-year effort. Page 105.

DEC enhances link to Disoss

By John Ditz
CW Staff

MERRIMACK, N.H. — Digital Equipment Corp. last week enhanced its compatibility with IBM's Distributed Office Support System by adding the ability to exchange revisable documents with IBM environments.

The External Document Exchange with Disoss software runs under VMS on systems ranging from the VAX-11/725 to the VAX 8600. It complements DEC's Disoss Document Exchange Facility, announced last October, which enables users on a Decnet network to read but not revise Disoss documents.

Together the products enable DEC users

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Software vendors now feel pinch

By John Gallant
CW Staff

Last week, Applied Data Research, Inc. announced that it expects to report a loss for the second quarter of 1985, its first quarterly loss in two years.

For Martin Goetz, president of the Princeton, N.J.-based systems software company, ADR's flagging midyear performance came as something of a surprise. Just three months earlier, ADR had reported first-quarter revenue up nearly 60% and an increase in profits of more than 70%, compared with the first quarter of 1984.

Goetz, like many industry observers, thought the slump that slammed hardware makers spared large systems software vendors. But the software sector is finally beginning to feel the effect of that slowdown. While the news coming from the software industry front is not as grim as recent tidings from the hardware arena, the coming months are likely to bring reduced profit and revenue growth. The need for drastic cost-cutting measures is not yet evident, but such moves may be necessary if the impact of the slowdown is amplified.

"We thought the software industry was going to remain unaffected until about a

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PRODUCT SPOTLIGHT

Power of AT, clones wooing initial users

By Edward Wasner
CW Staff

Ten years ago, a desktop computer operating at 1 million instructions per second would have crushed the desk on which it rested. Such a machine, a mainframe like IBM's 370/158 Model 3, would also have cost more than $1 million.

Today, that same raw power is available with an IBM Personal Computer AT, weighing less than 30 lb and priced at $3,999 in its basic version.

Nearly 10 years after the birth of personal computing, the IBM Personal Computer AT and compatible machines mark how far computer technology has come. Running a 16-bit, 6-MHz microprocessor — the Intel Corp. 80286 — and offering optional 20M-byte internal hard disks, these machines are roughly three times as fast as the IBM Personal Computer yet run most Personal Computer software. The AT and compatibles can support several users, turn their hard disks into local-area net file servers and, with the right operating system, potentially address 16M bytes of random-access memory.

Although some pioneering users are breaking ground with the AT as a multiuser machine or as a local-area network server, most users are being drawn to the AT and its clones because the machines are speed demons offering high-capacity storage.

As a result, the AT and compatibles have remained single-user, stand-alone micros running the same business software as their predecessors. Developers said software that exploits this new-generation hardware is lacking because of the limits of IBM's PC-DOS (see story page 18). Industry analysts, meanwhile, said the dearth of multiuser systems arises from the lack of software to run under IBM's PC Xenix, the AT's multiuser operating system.

The biggest reason is likely that users want nothing more than a faster Personal Computer. At the New York headquarters of Merrill Lynch, Pierce, Fenner and Smith, Inc., for instance, 100 ATs are meeting the needs of "a lot of people who use heavy spreadsheets [and who] were complaining [about] how long it took to compile them," reported Carol Ross, manager of personal computer support. "They zip through their spreadsheets now," she added.

Elsewhere in Manhattan, at the headquarters of Home Insurance Co., Anthony S. Graffeo, senior vice-president of information systems, reported that the firm's personal computer users

See AT page 15

Credit card scam laid to DP workers

By Mitch Betts
CW Washington Bureau

DENVER — Two computer operators at a firm here that issues credit cards last week agreed to plead guilty to participating in a crime ring that created about 40 fraudulent credit cards and ran up charges of $50,000, U.S. prosecutors said.

Assistant U.S. Attorney Frederic S. Stephens said that Ella L. Johnson and Carol L. Pena, data entry operators at Consumer Retail Services, Inc., agreed to plead guilty to computer crime and credit card fraud charges after discussions with federal authorities. The defendants could not be reached for comment.

A federal grand jury here recently indicted seven people in the alleged credit card scheme, which operated from November 1984 to April 1985, according to the indictments. The computer center issues Citibank Goodyear Silver Card credit cards for use in Goodyear Tire & Rubber Co. retail stores, prosecutors said.

Prosecutors alleged that the computer operators repeatedly assigned new account numbers to themselves and associates and issued credit cards. They allegedly used the credit cards to purchase merchandise up to the credit limit and then altered the computer records to send the bills to fictitious addresses.

"This went on for several months before it was discovered," one prosecutor involved in the case said, adding that the center has since tightened its security. At the time of the alleged offenses, this prosecutor said, the center did not check whether each account created in the computer had matching credit applications and approval forms.

The indictments, filed in U.S. District Court here, contain charges based on the Computer Fraud and Abuse Act and a credit card fraud law, both enacted by the U.S. Congress last year. Under the Computer Fraud and Abuse Act, it is a misdemeanor crime to gain unauthorized access to data bases containing financial data protected by the Right to Financial Privacy Act.

Johnson, Pena and James R. Murray were charged with the computer crime, as well as with distributing and using fraudulent credit cards. The other defendants, Daria Espy, Daniel E. James, Stephen Blea and Michael D. Huntington, were charged with credit card offenses and, most have agreed to plead guilty, Stephens said.

Editorial leadership changes at CW

Terry Catchpole has been named editor in chief and Sharon Frederick executive editor of *Computerworld* newspaper.

Catchpole succeeds John Whitmarsh, who has served as editor in chief since 1981 and who resigned July 12 for personal reasons. Frederick replaces Rita Sheor who left the company after five years to pursue new business opportunities.

Catchpole has 12 years of editorial experience at a variety of publications. Since 1983, he has been editorial director of *Business Computer Systems*, a monthly magazine for corporate computer managers published by Cahners Publishing Co. He also was responsible for the start-up of another Cahners publication, *PC Products*, and served briefly as editorial director of that magazine.

Before his entrance into computer publishing, Catchpole was editor in chief of *Boston Magazine*, an award-winning city monthly, and held a number of editorial staff positions with Playboy Enterprises, Inc. in Chicago. His articles have appeared in periodicals from *National Lampoon* to *National Review*, and he has both written and edited books on subjects ranging from the political activities of organized labor to a forthcoming history of sports at Harvard University.

Catchpole's computer-related activities also include election to the board of directors of the Boston Computer Society, the nation's largest computer-user organization, and volunteer publisher of the society's bimonthly magazine, *Computer Update*.

Executive Editor Frederick is also joining *Computerworld* from the staff of Cahners' *Business Computer Systems*, where she has served as managing editor since 1983. Previously, she was a senior editor at *Inc.* magazine and associate editor at *Electronic Business*. At the latter publication, she won the prestigious Jesse H. Neal award for feature writing.

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NEWS

Software execs weigh slump's impact on their firms

It is sometimes said that where you stand on an issue depends on where you sit.

That aphorism holds true for the top executives at three of the leading large systems software firms. Whether the executives believe the computer industry slump has affected software makers in general depends in large measure on their perceptions of how it has affected their particular firm.

Management Science America, Inc. (MSA), the Atlanta-based applications software leader, announced in April a first-quarter loss of nearly $3 million. But Dennis Vohs, MSA's executive vice-president, said the loss is typical of the firm's first-quarter performances and is not related to the slowdown.

"We are the largest vendor of applications. But even with our size, the level of activity in the software market today exceeds our capability to keep up," Vohs said. "The slowdown in hardware deliveries has not affected us. If a potential customer has cut back on capital spending, we will go after someone else who has not slowed spending. There is still a tremendous demand for software."

But at Applied Data Research, Inc., which expects its first quarterly loss in two years (see story page 1), the outlook is different. President Martin Goetz said he believes the long arm of the slump has finally reached the software industry.

'There has been a general belt-tightening'

"We will make up for the loss in the second half [of 1985]," Goetz said. "But delayed sales and price cutting by our competitors are both signs that the slowdown has reached software companies. There has been a general belt-tightening. Customers are being more careful in justifying a purchase."

Robert Goldman, president of Cullinet Software, Inc., which recently trimmed its first-quarter growth projections, said the slowdown has impacted vendors. But Goldman feels a variety of profit and growth opportunities still exists.

"I would have to agree that there has been some impact," Goldman said. "But certainly less than in the hardware area. Capital expenditures have slowed, and buyers are somewhat more careful. The sales cycles are longer, there is more caution, and, in some cases, purchases require higher approvals. But users are really looking for a good return [on investments], and software can still provide that."

— John Gallant

SLUMP from page 1

month ago," Goetz told *Computerworld* last week. "We had forecast a small profit for the second quarter. But our June sales were significantly less than expected. We now believe that the general decline is starting to hit the software industry. [Cullinet Software, Inc.] said that earlier, but we did not see it. We are seeing that impact now."

What Cullinet said about a month ago, according to President Robert Goldman, was that its first-quarter growth would be lower than initially forecast. Rather than falling within the 40% to 50% growth range predicted for the entire fiscal year, first-quarter growth was slated to be between 30% and 40%.

Westwood, Mass.-based Cullinet's previous fiscal year ended with profits and revenue up 50%, although the fourth-quarter profit dipped below 50% for the first time in several quarters.

Stephen McClellan, vice-president of New York-based Merrill Lynch, Pierce, Fenner and Smith, Inc., said Cullinet's revised growth prediction was the first indication that the industry slowdown was beginning to affect vendors.

Selling cycle is lengthening

"The impression that the slump is not affecting software companies is changing," McClellan said. "It is not just affecting Cullinet and ADR. Other companies are sending signals that the selling cycle, especially for bigger ticket items, is lengthening. Over the next 12 months, we will see growth slowing."

But where the slowdown has meant layoffs and losses for hardware vendors, software companies may only have to adjust to reduced revenue and profit growth, most analysts said.

"Users are not buying as aggressively as they did in 1983 and 1984," said Peter Cunningham, president of the Mountain View, Calif.-based market research firm Input, Inc. But he said Input has predicted that the software and services sector will still grow at a rate between 25% and 30% this year.

"You have to remember that 1983 and 1984 were absolutely incredible years," Cunningham said. "You had this massive rebound from the major slowdown that had started in 1980. What is happening is that growth rates are getting more realistic. That is not a slowdown but an adjustment to a more normal rate of increase. Unfortunately, a lot of these companies do their forecasting using their sales force as an indicator. They are overly optimistic."

Scott Smith, vice-president of Stamford, Conn.-based Gartner Group, Inc., agreed. "Overall, the outlook is very healthy. If deals get pushed out a little bit, it is not the end of the world. Users are still looking at new applications, and in-house development is tremendously more expensive than buying a package. The growth in the business is there. It may be 25% and not 35%, but that is still a very healthy rate."

Smith and other analysts said that those vendors marketing high price tag products, such as data base management systems, will be affected more severely by the capital spending belt-tightening and lengthened sales cycles that accompany the slowdown. Cullinet and ADR, both of which have made large gains in the DBMS marketplace, have already felt the impact.

Thus, said Damian Rinaldi, director of International Data Corp.'s Software and Services Information Program, the large systems software market will become more competitive, and vendors will begin eyeing each other's turf.

'Could be a nasty period'

"The next year will be a time of consolidation," Rinaldi said. "If the vendors are not effective in positioning themselves for this slump, it could be a nasty period. Things are tougher than usual, and it will require a greater management effort to come out whole."

But Input's Cunningham said software vendors must be cautious in trimming hiring, training and development costs in reaction to the slump. "Those costs will have a negative impact on profitability in the short run because the revenue growth will not be quite as strong as it has been.

"But hiring and development plans cannot be turned on and off. If the vendors try to yo-yo around with development right now based on quarterly fluctuations in orders, they could be in pretty deep trouble."

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Computerworld (ISSN-0010-4841) is published weekly, except January (5 issues), February (5 issues), March (5 issues), April (5 issues), May (5 issues), June (5 issues), August (5 issues), September (5 issues), October (5 issues), November (5 issues) and a single combined issue for the last week in December and the first week in January by CW Communications/Inc., 375 Cochituate Road, Box 880, Framingham, Mass. 01701.

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Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

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ISSN 0010-4841/85 $3.00 + $.50. $2.00 a copy: U.S. — $44 a year; Canada, Central & So. America — $110 a year; Europe — $165 a year; all other countries — $245 a year (air-mail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin.

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CW PHOTOS BY MITCH BETTS

William McGowan

The telecommunications industry was stunned late last month when MCI Communications Corp. acquired Satellite Business Systems (SBS) from IBM and Aetna Life & Casualty Co. in exchange for IBM acquiring a 16% equity interest in MCI. The pending agreement appears to be one more giant step forward for MCI's colorful chairman, William G. McGowan, in his 17-year battle to untangle AT&T's hold on the long-distance carrier business.

The alliance has provided MCI with the immediate benefits of prestige among potential corporate clients and the financial backing of one of the world's largest and most profitable corporations. IBM has the option to acquire 30% of MCI, and some analysts speculate IBM may someday swallow MCI totally, as it did Rolm Corp. In a recent interview with Computerworld staff writer Clinton Wilder, McGowan explored the immediate and potential benefits of association with IBM and the impact on his firm's long-time adversary, AT&T.

With the IBM-SBS partnership, what can MCI now offer to large corporate MIS departments that you could not before?

We actually started in 1981 to plan to offer the larger, more sophisticated user digital networks — such as sophisticated packet switching networks. [We knew] it would take us a while to put it in place, but we started back then.

It was clear in 1982, with the divestiture announcement, that the time to do it was now. So we started putting in digital overbuilds on all of our microwave systems, and we started putting in fiber-optic systems. We said in 1981, "no more analog switches; only digital switches." Eighty-five percent of our ports now are digital.

So we put in place a system that we're just now starting to offer — a high-speed packet-switch network for corporate use — which we'll customize and put in place. We did it for ourselves last year and for [Security Pacific National Bank] so far this year. We offer [Security Pacific] a virtual private-line network — voice and data.

So we're in a position to [offer these types of networks]. I think the advantage we have right now with the combination is that [IBM has] — more than we have — a technical engineering capability to support that kind of thing for many, many more customers. So [IBM] gives us a lot more depth . . . maybe doubling or tripling or quadrupling the technical competence and capability we have.

Is the idea of "cradle-to-grave" data and communications services from IBM a realistic concept for the future?

It's less probable than it was before. [IBM] did have a subsidiary that they had full control of with 60% [ownership], and now they've backed away from that. I don't think [IBM feels] the need . . . to offer [these services] . . . for those customers who wish to have them. I don't think [things have] changed.

With SBS, IBM could serve someone who said, "I want to have someone come in and do this whole thing. I don't know how you guys are going to do it, but I want it done and handed to me on a platter." [MCI] will be there to do that, but we'd be there to do it anyway. If those customers say they have something for bid, a Rolm or IBM or [Northern Telecom, Inc.] will say, "Who am I going to do it with as a partner?" Well, that won't really change. Basically, we'll do our share, [AT&T] will do their share; we'll charge our rates, and they'll charge theirs.

But I don't think [the demand for single-vendor service] will ever be the case for most users. Our industry is clearly moving away from the experienced buyer/inexperienced management situation because communications managers are experienced. It's taken data processing 30 years to do it, where it will take [the communications field] five — it takes everything five now instead of 30 — to move from the experienced manager/inexperienced boss over to the experienced organization. A Security Pacific, [Westinghouse Corp.] or [Citibank N.A.] . . . really doesn't need that hand-holding, education, support that the inexperienced buyer does. They do need absolute assurances that you know what the hell you're doing. And they need to have proof that your commitments are fulfilled, that your plate isn't overfilled and they won't get slipped over to the side of it.

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MCGOWAN from page 6

I think this [MCI-IBM partnership] will help them in that regard. For all of the large users that we've had — really, at the beginning of the company, we were selling to large users — for all these years, we maintained them and supported them, but we really didn't go out and try to expand that. We had other things that were more directly attributable to our life.

But you will be doing that now?

We started about a year or so ago. We've added now several hundred people [to do that] . . . and gave all of our divisions two criteria for structuring themselves. They all have completely separate national account marketing, because it is an entirely different sale. And the second thing was an entirely separate customer service group, separate from sales. [That's because] if you tell a salesman he's got a quota, he'll put all his resources there and customer service suffers. So all seven of [MCI's divisions] have those separate entities, and we've done very well — a tremendous amount of orders.

I think this [IBM partnership] will improve the process, but I also think it will bring us more quickly over to the more sophisticated networks.

What new technologies can you now pitch to these large corporate accounts?

The first phase is that we'll see the typical corporation going into a digital environment — mixed voice/data, predominantly voice, some of them exclusively [voice]; they'll talk about 1.544 megabits [per second], but you'll find if you ever look into that, you really have a voice network.

Once you start moving into the digital world, we're talking about bit streams of 405 megabits with fiber. We'll be fully converted to 810 [megabits] before the end of 1986, and I know that we're moving to 1,620 megabits.

It's going to get to the point where a lot of the tricky stuff, such as bandwidth compression, is not going to be needed for a long time. The sheer pipe size is getting so enormous; why should you go through those shenanigans when you've got such massive quantities? Increased value in communication breeds more communication.

You see more and more articles about [corporations] using these disciplines as a competitive weapon and as a way to differentiate between [you and] your competitor and as a way to make a profit. Once you start seeing articles like that, you know you're really going to see [the telecommunications market] go. As that starts, you're going to truly get mixed networks.

Right now, we've been fairly well limited to the long-distance segment, completing our switches and so on. But the local phone companies know they have to get in on the act or they're going to lose out. So now they're starting to say, "Sure, we'll install fiber, we'll give you T1, we'll do this." We're interfacing now with damn near every one of those companies.

Now the customer, back through us to the local phone company, is starting to put together a PBX or front-end processor or whatever you want to call it. I try to tell everyone this is not a phone (pointing to a telephone). It's no more a phone than the man in the moon. It's a terminal. I don't do anything here, I just instruct something else down there to do something. The "phone" doesn't exist anymore.

As you start moving into that environment — and that's going to happen very quickly — all of a sudden it really becomes the digital world. I don't really care if you digitize it in my mouthpiece or on my seventh floor. Once you're there, you're into a completely internalized, heterogeneous world of communication where it all is digitized. We digitize everything. When you think about it, it's kind of crazy — we've been digitizing everybody's communication now for eight years, and on both ends of it we convert it back to analog, just to get you through the switch.

The thing that's going to be interesting is, internationally, what is going to happen to the position of the MIS guy. Once an organization starts saying, "With all the data processing, computing capabilities I have, why don't I do like other people and use them as a way to make money?" Once that happens, then the world changes. It really does.

Where is MCI positioned to take advantage of these fundamental changes?

We're not going into an information age or an information economy; we're bringing in the information technologies now as a vital part of the way we do everything. Of the top 100 organizations that we've identified as our potential biggest buyers, 80 were industrial . . . as we've seen with [General Motors Corp.] That's how you become more efficient in manufacturing. You have to use the information technologies.

What we are is just like the transportation system. Instead of goods, we are the transportation system for all the information in the country. And just like the transportation system, all the dirt roads had to be replaced with a new infrastructure. Well, we have to do that.

[The old Bell system network] was only satisfactory for voice conversation. But for every other application, it's either way too big or way too small. If I'm working here (pointing to microcomputer) — it's terrible, the company standard is an IBM [Personal Computer] and I'm on a [Kaypro Corp. micro] up here — [I'm transmitting at 1,200 bit/sec.], but most of the time when I travel, I'm on a workstation with 300 [bit/sec.]. So what the

See [illegible] page 8

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DISOSS from page 1

to search for documents filed in an IBM host-based Disoss library and access them to read or edit. Conversely, DEC users can now create documents using DEC word processing programs — such as WPS-Plus and DECDX — and file them in a Disoss library to be read or revised by other DEC or IBM users.

Gives DEC the lead

This capability "gives DEC a significant lead over competitors like [Data General Corp.] and [Wang Laboratories, Inc.] in delivering meaningful bridges to IBM mainframes," according to William F. Rosenberger, director of strategic planning with the Yankee Group, a Boston-based research and consulting firm.

EDE with Disoss builds on DDXF, which, as part of Digital's Decnet/SNA gateway product set, is said to provide for the two-way transfer of data between DEC machines and systems within IBM's Systems Network Architecture (SNA).

DDXF provides DEC environments with Disoss library functions — analogous to a real library of documents — and distribution services, which pass documents among different machine types. DDXF performs, among other things, the format conversions needed to exchange final-form documents between DEC and IBM environments.

EDE with Disoss enhances this capability by enabling users to revise documents created or accessed from a DEC environment. This software is said to conform to IBM's Document Interchange Architecture and Document Content Architecture using LU6.2, an SNA convention for peer-to-peer communications capabilities.

Documents within an IBM Disoss library can now be transformed into DEC WPS-Plus or DECDX documents that can be read or revised. Similarly, documents created under these DEC word processing programs can be sent into Disoss as revisable or final-form documents.

The Disoss implementation "looks very clean," Rosenberger said of the product. "The degree of compatibility is extensive."

One advantage of the DEC implementation is that "DEC added their own Disoss menus and user interfaces so DEC users would feel comfortable and familiar with what they are seeing," according to Andria Rossi, associate editor of Seybold Publications, Inc.'s "Seybold Report on Office Systems," a monthly industry report. "That's not always the case and certainly not the case with IBM."

Both final-form and revisable-form IBM documents are accessed through EDE menus. For simplicity these menus can be further integrated into the company's All-In-One office information system. Using All-In-One commands, "EDE with Disoss lets users search for, retrieve, file, edit or delete documents residing in an IBM host document library," DEC reported.

Future acceptance

Although the installed base of IBM's Disoss is small, according to Rosenberger, he said he believes Disoss compatibility is critical for companies selling departmental systems because its future acceptance is expected to be high.

"It's quite important that DEC show and deliver this type of bridge to IBM mainframe Disoss environments," he said.

Beside Decnet/SNA DDXF, users who want to implement EDE with Disoss must have Decnet VAX and the firm's Decnet/SNA Gateway and Gateway Access Routines. The gateway appears to the IBM Disoss host as a Type 2 Physical Unit within SNA. It can reportedly support multiple simultaneous Disoss sessions.

EDE with Disoss, which is available now, costs $3,000 to $4,500, depending on the VAX configuration.

When bundled with the other components required, the implementation will cost between $27,000 and $45,000.

DEC is headquartered in Maynard, Mass. 01754.

MCGOWAN from page 7

hell am I doing on a 4-KHz circuit?

So what we are going to be is the provider of the transportation system for that [data communication]. We have more customized services — the MCI Mail system, packet switching — we'll have all of those bells and whistles. It's going to be a good combination together [with IBM], because [AT&T] has one basic technology, and we have them all. And you really need a mixture. So we'll be very much helped in that regard.

How do you continue to argue for regulation of AT&T, given IBM's presence?

The day before we made the announcement, IBM had 60% control of a long-distance carrier. The day after, they had 16% control. So they've always been here. But I think a more relevant point is that we believe that [AT&T] should be deregulated — but they should be when there is viable and sufficient competition in there to truly say that the customers do have some choice, and that [AT&T] can't use their monopoly power as a monopolist.

For example, if they were deregulated, and they said the rates from Boston to anywhere else are going to be quadrupled tomorrow, our Northeast division would really smile a lot because we know we'd get a lot of calls and a lot of customers. But we also know that after three or four days of calls, we'd have to say, "No more." Because we couldn't handle them. A few other guys, I guess, have some capacity and they'd be carrying some, but they couldn't handle very much. Now what happens to the 85% or whatever that's left? They'd have to pay four times as much.

The proof of it is that there isn't sufficient capacity out there. [AT&T says] they have 400 competitors. That's not true; 396 of them are using their service. You call that a competitor? It's who has the capacity, what sufficient share is there of the market — I think the [Federal Communications Commission] should start gradually deregulating. I don't see a problem with that, but you've got to recognize realistically that the time is not now.

Will equal access meet the September 1986 target date?

It will, I think, for two main reasons. The [U.S. Department of Justice] has made clear and explicit instructions to each of the [former] Bell operating companies about their failure to do what they should have done to date, and about the requirements that they do it, and to come out very quickly with the information.

They also have been investigating AT&T about some of their conduct and appear willing to act on that. I don't think I should say any more that they're crooks, but they misappropriated our customers in the hundreds of thousands. So I think that [equal access will meet the target], and these next couple of years are clearly the most important in the life of this industry.

In places where there is true equal access now, how have you done in terms of market share?

We get somewhere between 10% and 15% of the market; we get more in customers, perhaps, but in dollars, which is more significant, 10% to 15%. Since we're at five [percent of the overall market], it's not that tough.

Does IBM's affiliation help you in that market share battle?

Not in the short term. But you have to succeed in our industry in two things. One has to succeed in the large fiscal arena. Not only is [IBM] a very big customer in terms of dollars, but it is the leading edge of what you have to constantly be, which is better and better. And you also have to be successful in mass merchandising, because you still have the system which doesn't wear out by usage, and you like people [calling] at night and on weekends, for example.

Clearly, we've done fairly well in mass merchandising. We started to do all right with large users, and it's going to accelerate that. Obviously the affiliation has a rub-off, a cachet. There are people out there who are saying, "There's a whole bunch of people out there. Which ones can I have confidence in?"

But I don't find that any different from our affiliation with [American Express Co.] and with [Sears Roebuck & Co.] For a certain group of people, American Express is just fine. And even with Sears, they have a fabulous reputation with an enormous number of people, maybe not hugging the East or West Coast, but in the rest of this country. Our affiliation with them, I think, helps too. And this [IBM] affiliation will help. There are certainly a number of people who have strong feelings there too.

After the $400 million IBM funding for the first three years, how do you see the IBM fiscal stream proceeding? Is there a chance of the funding stream drying up?

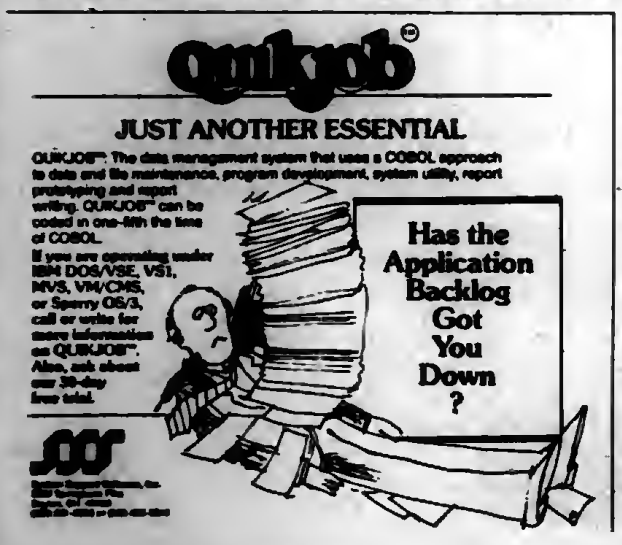
We specified $400 million just so we had some number; [IBM hasn't] said that there's a limitation on it, nor have they said there are any guarantees beyond that. But one of the reasons we did it — and they didn't resist it at all — was that I wanted to have forward funding. We've always been that way. I guess living through a period when we had a negative net worth of $6 or $7 million, and we owed the banks $100 million, made us more conservative than most companies.

Ever since then, we've always funded ourselves in advance. We've never used short-term borrowing to fund long term. We have $800 million in cash in the bank today. I saw where we were listed in *Dun's Review* as the 84th in the U.S. of any corporation for positive cash flow.

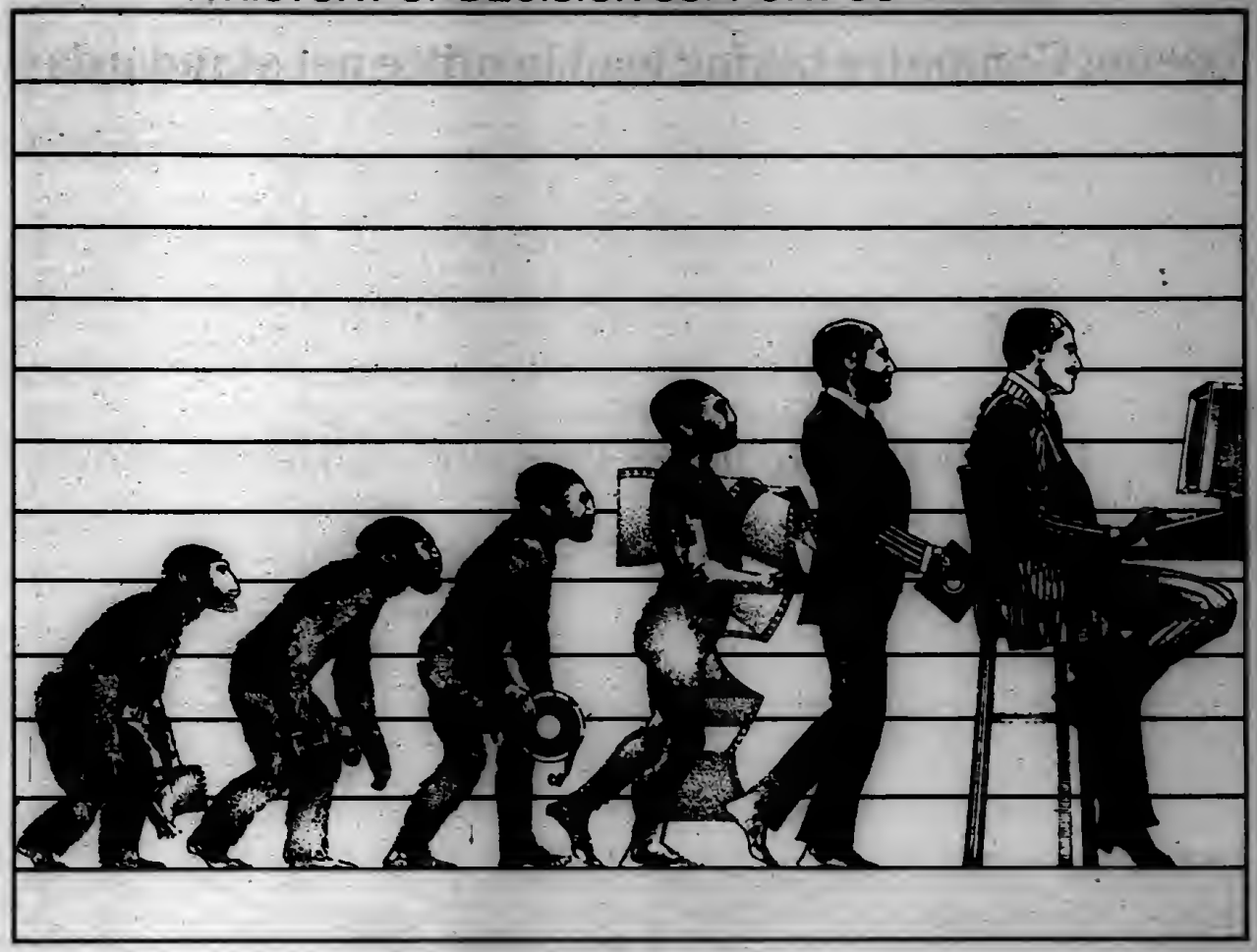
The ownership maximum was not at all resisted by [IBM]. They're free to go out in the marketplace and purchase, but how much they own is certainly going to depend upon the equity attached to the $400 million, and that's a floating percentage based on the market at that time. I calculated it at [an MCI stock price of] $12.50. If they converted at that price, it was 26.1%.

I don't see this place changing. [IBM's] not interested in any affiliation that the other people aren't interested in.

You have to understand, I need stockholders. Preferably wealthy, preferably understanding of what we're doing here — not in three-month or six-month programs but longer term. Preferably capable of staying power, preferably capable of giving us more money when we need it and preferably, if possible, helping us in other aspects of our business. And they fit all of those.



A HISTORY OF DECISION SUPPORT SOFTWARE



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NEWS

Boeing Computer taking lead in office net standards

SEATTLE — Boeing Computer Services Co. is trying to do for office networks what General Motors Corp. is attempting in the factory: forge a set of specifications out of international standards that equipment suppliers can incorporate to ensure compatibility with other vendors' machines.

Although this would seem to be the goal of standards, fully specified standards do not yet exist. Even those subsets that are specified offer options that can render various implementations incompatible.

It was this fact that encouraged GM to create the Manufacturers Automation Protocol (MAP), a set of specifications that suppliers of factory automation equipment must conform to if they want to sell to GM. Other manufacturers can specify MAP compatibility to ensure that the systems they procure can communicate.

Boeing Computer wants to do the same thing for local networks in the office through the development of its Technical Office Protocol (TOP), according to Sheldon Blauman, Boeing Computer's manager of network architecture planning.

Boeing Computer and GM have been working together on these specifications since their joint demonstration at last year's National Computer Conference (see story below). The companies have formed a joint steering committee and will co-sponsor a similar demonstration in November at the Society of Manufacturing Engineer's Autofact factory automation show in Detroit.

Like MAP, TOP incorporates, where possible, the ratified portions of the International Standards Organization's seven-layer Open Systems Interconnect (OSI) network reference model.

TOP and MAP are similar in their conformance to the fourth, or transport, layer of the OSI model. This layer is used to create virtual circuits between devices and ensures that data is delivered in order and uncorrupted. The specifications differ, however, above and below this common mid-layer, Blauman said.

Differences below the transport

See TOP page 11

CICS–JUGGLER

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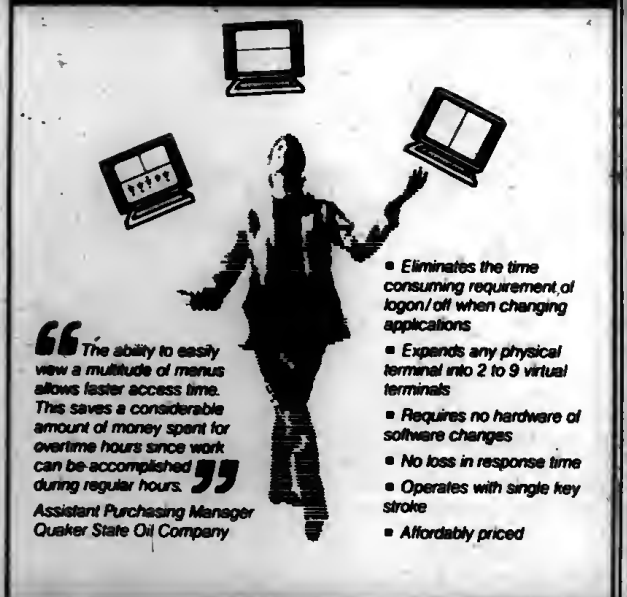

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SYSTEMS

Happy returns: IRS heads off computer fiasco rerun

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — The Internal Revenue Service is taking steps to ensure that this year's computer fiascoes, which delayed the processing of tax returns for several weeks, will not happen again next year.

According to IRS Commissioner Roscoe L. Egger, the IRS plans to acquire additional computer capacity at IRS service centers, provide additional training for programmers and conduct a complete review of computer operations.

"Taken together, these efforts are the start of what will be a continuing process to make certain we avoid the problems faced by taxpayers this year," Egger said at a recent congressional hearing.

The processing delays occurred because of problems with a modernization program that replaced aging computers with newer Sperry Corp. 1100/84 multiprocessors and converted 1,500 IRS programs from assembly language to structured Cobol [CW, April 15].

Specifically, the computer problems included slow Cobol programs, bugs in applications and operations software and numerous glitches in 48 heavily used tape drives, according to Thomas Laycock, assistant IRS commissioner for computer services.

The result of the processing problems was a multitude of reports about angry taxpayers and legislators and demoralized IRS workers. Also, the IRS had to pay 13% interest on late refunds.

IRS caught up to 1984 processing rate

At the latest congressional hearing on the episode, held June 21, Egger reported that the IRS had caught up to its 1984 pace of processing tax returns. "This achievement has been reached only through the effort and dedication of literally thousands of IRS employees who have worked nights, weekends and holidays to reduce and finally eliminate the backlog we faced early this year," he testified.

Egger said the most important lesson the IRS learned from the experience is that "despite careful planning and scale-model testing, you cannot know how a high-volume data processing system will work until you actually place the high volume on the system."

IRS officials stressed that the antiquated IRS hardware — 10 to 16 years old — had to be replaced. "We expected problems from the conversion, and we experienced somewhat more problems than we anticipated," Egger said. "But, there simply was no alternative to the replacement of the aging equipment," he said.

Egger apologized to U.S. taxpayers for the frustration they experienced and added, "Frankly, this year has been frustrating for us as well."

One legacy of the 1985 tax season may be skepticism about IRS computer capabilities, at a time when the IRS supports greater reliance on computers for tax processing. At a recent hearing on the Reagan administration's tax reform proposal, one legislator questioned whether the IRS could handle the proposed return-free tax system, in which the IRS would use its computers to calculate income taxes for more than half the nation's taxpayers.

"I am concerned that if we add additional burdens [to the IRS computers] we are going to blow a fuse somewhere," commented Rep. Richard T. Schulze (R-Pa.).

Egger explained that the return-free system would require a big investment in new equipment, including document scanners, to compute income taxes based on data supplied by employers and other parties.

TOP from page 10

layer include the type of local network specified.

The first document outlining TOP — to be followed by a second Boeing Computer document giving actual TOP specifications — will show the intended use of IEEE 802.3 Ethernet-type local networks, as well as 802.4 broadband token-passing bus networks, probably used in a backbone capacity, Blauman said. MAP uses only the latter type.

Other differences

Above the transport layer, the network architectures differ in the applications supported, reflecting the different needs of factory and office networks.

Boeing Computer, for example, supports the OSI file transfer protocol, which is still under development.

While GM is also said to support that protocol, it has developed another protocol that is optimized for process control environments — streamlined to provide the needed speed — which the company is pushing to get standardized.

Case facilitates development

Applications development in either environment will be facilitated with the Common Application Service Element (Case), an OSI tool. Blauman said Case is a set of common subroutines that can be incorporated into an application to give it the proper hooks into a network architecture.

After TOP basics are aired and understood, Blauman said, Boeing Computer will address controversial areas where problems need further defining.

The first TOP document will, for example, talk about the CCITT's X.400 messaging standard. That recommendation, according to Blauman, needs to be upgraded to incorporate better management.

Other needs that must be addressed by standards, he added, include graphics, revisable text, data base management and operating systems for certain applications.

TOP's clout

The clout behind TOP is Boeing Computer's purchasing power. The company has, by rough count, 25 to 30 IBM processors running the size gamut from 4300s to 3084s.

Other machines include Control Data Corp. and Cray Research, Inc. processors and a slew of minicomputers.

To date, the company has used this clout to encourage equipment suppliers to provide it with machines that are compatible with IBM's Systems Network Architecture (SNA). SNA, Blauman said, is a fact of life.

In the future, Boeing Computer will require office systems to be compatible with TOP and will require suppliers of factory devices to conform to MAP.

OSI protocols

MAP and TOP will eventually be interconnected with internet protocols specified within OSI, a capability that will be demonstrated for the first time at the Autofact show.

Both specifications come under a grand strategic plan called the Boeing Network Architecture (BNA). Started in 1979, BNA is based on SNA and charts all of the company's communications efforts, was started in 1979.

Aside from the office and factory automation, part of the goal of BNA is to provide common data access that will require all of the company's data base management systems to talk together, according to Martin Ritchie, Boeing Computer's manager of network applications development.

Boeing Computer is one and a half years into this five-year project.

Another BNA goal is to provide for distributed applications where an application can, through the network, find the resources it needs to complete a task, Ritchie said.

Within BNA, TOP will point to the segments of standards Boeing will use in office communications, Blauman said.

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Cincom announcements stretch applications software

By John Gallant
CW Staff

CHICAGO — Cincom Systems, Inc. today is expected to unveil a major release of its manufacturing system, three additional packages for its manufacturing and financial software series plus other enhancements to packages in its Business Control System series.

Cincom is slated to announce the new and enhanced applications at a news conference during the 1985 National Computer Conference (NCC) here.

The Cincinnati-based vendor has built a reputation on the strength of its systems software offerings, but the announcements will continue the company's expansion of its applications software line. The product launchings will include the following:

- Release 5 of Control:Manufacturing, Cincom's closed-loop manufacturing control system.
- Cost Management and Lot/Serial Number Traceability modules for Control:Manufacturing.
- An enhanced version of the Purchasing module of Control:Manufacturing.
- An Accounts Payable module for Control:Financial, Cincom's financial information system.
- An enhanced version of the Accounts Receivable module of Control: Financial.

According to a Cincom spokeswoman, Release 5 of Control:Manufacturing, which is available for IBM mainframes and Digital Equipment Corp. VAX processors, includes enhancements that make it a foundation for the added Cost Management, Lot/Serial Number Traceability and Accounts Payable modules. The system is integrated with Cincom's data base management system, fourth-generation language and decision support products.

In addition, Release 5 allows displays and updates developed with Cincom's Mantis applications development system to be added to user menus and accessed through transactions or programmed function key activity. The capability allows Mantis to be used to customize displays and updates or to add others.

The spokeswoman said the text management facilities incorporated in the system's Purchasing module have been repackaged as part of the basic system control component. The enhancement allows users to maintain internal and external related text and associate text data with any key or record within the data base.

The Shop Floor Control component of Control:Manufacturing has been enhanced to support tasks including production scheduling based upon an operation-level yield/scrap factor, definition and reporting of rework operations, definition and reporting against secondary resources and optional percentage-complete reporting. Control:Manufacturing costs between $100,000 and $400,000.

The Cost Management module of Control:Manufacturing is integrated with related Control:Financial modules and is made up of three components that provide cost control by tracking, accumulating and reporting standard and actual costs and detailed variances. The components include Cost Roll-Up and Audit Process, Inventory Accounting and Production Accounting. The module costs between $25,000 and $65,000.

According to the spokeswoman, the Lot/Serial Number Traceability module is designed to aid users in meeting material and procedures record-keeping requirements. It will be available in October and will cost between $12,500 and $30,000.

The added Accounts Payable module for Cincom's Control:Financial system reportedly gives users the ability to process payments quickly and accurately with reduced clerical effort. It costs between $30,000 and $80,000.

Enhancements to Control:Manufacturing's Purchasing module are said to improve support for blanket purchase orders and requisition approval. It costs between $25,000 and $65,000. The enhanced Accounts Receivable module of Control:Financial now provides multiple organization support, real-time credit management, flexible cash application, customer grouping and cash forecasting and aging capabilities. It costs between $30,000 and $80,000.

Cincom Systems can be reached through P.O. Box 11189, 2300 Montana Ave., Cincinnati, Ohio 45211.

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FCC denies building occupants right to access spare cabling

WASHINGTON, D.C. — The Federal Communications Commission said last week that local telephone companies are not required to let building occupants use spare wire pairs found in many buildings.

The International Communications Association (ICA), which represents large users of telecommunications systems, requested that the FCC grant users the right to use spare cable pairs, as well as the right to see telephone company wiring plans. Wire installed before the FCC deregulated customer premises equipment two years ago is owned by local telephone companies.

The FCC said it will not require a telephone company to make spare cables available in a building, declaring that the issue was similar to a previous attempt by users who wanted access to conduit space.

In an earlier ruling, the FCC refused to require AT&T and the regional holding companies to make conduit space available to users, saying that it would be impossible to write a tariff that avoided discrimination if there was not enough space in the conduit.

However, the FCC last week said users of large telecommunications systems who are in sole possession of buildings have the right to obtain from local telephone companies the complete wiring plans that serve telephone, voice and data equipment.

The ICA request refers to the large amount of existing wiring that is currently under an FCC plan to remove it from the rate base by accelerated depreciation. All new wiring is currently paid for by the telephone company and recovered from users through installation fees.

An FCC spokeswoman pointed out that telephone companies could provide the information on spare cable pairs in a building by their own volition. The spokeswoman said the FCC was concerned that use of the wire would harm other building services.

The FCC said it agreed with ICA that the telephone company must establish a clear distinction point between a customer's equipment and wiring and the telephone network when a single customer is the sole possessor of a building containing complex intrasystem wiring.

The FCC found that giving users rights to access existing wiring is not useful unless telephone company records and plans are made available. The telephone companies opposed the effort by ICA to be given access to wiring plans, noting additional record keeping and privacy concerns would be raised.

Sytek to introduce PC Network-compatible interface

MOUNTAIN VIEW, Calif. — Sytek, Inc. today will announce a local-area network headend that is compatible with IBM's PC Network and is designed to support very large personal computer nets. The product handles up to 1,000 nodes at distances of up to three miles in any direction, Sytek said.

Designed as an enhanced functional replacement for the PC Network's Translator Unit, the Sytek 6050 Network Translator is the first in the Sytek 6000 family of PC Network-compatible products for large microcomputer networks, according to Executive Vice-President Ken Biba. The family reportedly will extend Sytek's Localnet architecture, allowing broadband micro nets to coexist on a Sytek cabling system with Localnet 20 terminal-to-host networks.

Localnet 20 is Sytek's main product, and the company has installed more than 800 of them, some of which support more than 3,000 nodes. Co-developer of the IBM PC Network, Sytek also supplies IBM with network interface cards for that network.

Future Sytek 6000 family products will "enhance the PC Network in other ways," Biba said. Among these, he listed "interfacing to other networks, common shared services, common file systems and perhaps distributed applications."

Biba noted that the IBM net was designed for customer installation and is limited to 72 nodes and 1,000 feet. Sytek will offer a turnkey service for large microcomputer networks based on the 6000 family, handling all aspects of network design and installation, the company said.

The IBM/Sytek broadband personal computer net is a carrier-sense multiple access with collision detection system operating at 2M bit/sec. Net performance should not degrade unacceptably on a 1,000-node net seeing typical usage, Biba said. "In most applications, we find, the load on these nets is very small," he added.

The Sytek 6050 reportedly can coexist on a cable system that supports other services such as voice, video and data. The product offers adjustable gain, permitting micro networks to operate on non-Sytek broadband systems, according to the company.

The 6050 is said to work with single- and dual-cable systems and to connect to a branching-tree topology so that a single node can fail without affecting the entire network. The product is said to support industry-standard IEEE channel spacing.

One 6050 headend is required per network. It costs $4,100 and is scheduled for shipment in September.

More information is available from Sytek at 1225 Charleston Road, Mountain View, Calif. 94039.

Firm drops IBM charge

ENGLEWOOD CLIFFS, N.J. — Syncsort, Inc. announced last week it will not pursue the deceptive practices complaint against IBM that it lodged earlier this year [CW, April 22] with the Federal Trade Commission (FTC). Syncsort said IBM's June release of an updated version of DFSort [CW, July 1] resolved performance claims that Syncsort had alleged were deceptive.

IBM disputed Syncsort's interpretation of the June release.

Syncsort President Aso Tavitian said the company did not formally withdraw its complaint, but informed the FTC that "the benefits of further action, in [Syncsort's] judgment, will be relatively marginal."

The company developed and markets a sort utility for use on IBM mainframes built on the IBM 370 architecture and claims that 70% of users running IBM's MVS and MVS/XA operating systems have installed its product in preference to IBM's DFSort Release 6.

In February, IBM announced DFSort Release 7 and, Syncsort charged, attributed "significant performance improvements over Release 6" to microcoded 370/XA instructions called Sorting Assists. Syncsort charged in its April 16 complaint to the FTC that the performance upgrades were due to the allocation of up to eight times the additional memory space to operate Release 7 as had been used for Release 6.

In mid-June, IBM released a large number of product announcements, including DFSort Release 7.1, a maintenance version of Release 7. In the latest announcement, IBM said Release 7 performance improvement "is realized through the automatic acquisition of additional virtual storage." Regarding microcoded instructions, IBM said in June, "Release 7 offers further potential performance benefits ... through the use of the 370/XA sorting instructions."

Syncsort's Tavitian called the June announcement "a thinly veiled retraction" of the February claims.

An IBM spokesman said the June announcement unveiled additional performance improvements and expanded function and was not a response to Syncsort's charges.

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Who will emerge alive from the AT-compatible jungle?

Analysts predict the survivors

By Edward Warner
CW Staff

First there was the IBM Personal Computer AT with its high-speed microprocessor, optional 20M-byte hard disk and a lock built into its case. Then came the Kaypro Corp. 286i, introduced in March, and later that month, the Texas Instruments, Inc. Business-Pro. Soon after, like the jungle at dawn, the personal computer market was alive with the cries of at least a dozen AT-compatibles, all screeching "buy me!"

But the jungle is ruled by the laws of Darwin, and if IBM is expected to sell 175,000 ATs in 1985, a figure which is three times more than all the AT-compatible vendors combined, who else will survive?

Analyst Norm Dewitt, director of the Personal Computer Industry Service for Dataquest, Inc., a San Jose, Calif.-based research firm, picked three products to make it — two offerings from Compaq Computer Corp., both reportedly faster than the AT itself, and the highly expandable Business-Pro, which he said "will give end users quite a bit of confidence that [their machines] can grow."

The majority of those prowling the AT-compatible jungle were already manufacturers of IBM Personal Computer compatibles; they were forced into the AT market when IBM slashed prices on its low-end machines.

Now, the very survival of some compatible vendors is tied to their AT clones, according to analyst George Colony, president of Forrester Research, Inc. in Cambridge, Mass.

Kaypro, in particular, "bet the company on [the 286i]," Colony said.

As in the Personal Computer-compatible market, the AT work-alikes will have to offer IBM compatibility and added value, in that order, according to Colony.

Compatibility is important, he said, because IBM is shifting gears to emphasize Intel Corp. 80286-based Personal Computers, the next of which will be the PC2.

Next year, 55% of all IBM Personal Computers sold, he predicted, will incorporate the 80286, and the clone makers had better be compatible or they will not survive.

For reasons of compatibility, as well as speed, Colony, Dewitt and other observers have picked the two Compaq 80286-based machines, the Deskpro 286 and the Portable 286, as likely winners. Colony noted, however, that the TI Business-Pro will likely fail for its lack of compatibility.

As for added value, there is no question that the compatible vendors think they have it. Three vendors, Compaq, Corona Data Systems, Inc. and Televideo Systems, Inc., boast machines that can run at both the AT-standard 6 MHz speed and at 8 MHz, which reportedly offers up to 30% greater processing speed.

> *Now, the very survival of some compatible vendors is tied to their AT clones.*

Another vendor, ITT, offers two different speeds, that of the AT and the 4.77 MHz of the Personal Computer line. The latter feature reportedly would give the ITT Xtra XT full compatibility with the Personal Computer's software base, something even the AT cannot claim.

For expandability, the Business-Pro holds the edge with a whopping 14 expansion slots in its chassis. On pricing, it is Kaypro's 286i, retailing for roughly $1,000 less than the AT.

Ultimately, though, the Big Blue cat that stalks this market jungle may have the last growl — IBM could repeat its price cutting, this time at the high end.

That is, in fact, what some AT dealers say they have done in the face of growing stocks of ATs. Computertown, of Salem, N.H., for example, now offers a hard disk-equipped AT for $300 less than the suggested retail price.

The clone makers' other concern, though a bit more farfetched, is that IBM will kill the AT in order to avoid cannibalizing sales of other Personal Computers.

Adherents of this scenario include Corona Data Systems President Robert Harp, who is reported to have said in an interview that the AT is destined to be "wiped out" by the PC2, a machine that other analysts in addition to Colony expect to be based on the Intel 80286 chip.

Replacing the AT

Another believer is analyst Amy Wohl, president of Wohl Associates, Bala-Cynwyd, Pa., who has said she believes "IBM may bring out a product that replaces [the AT] before IBM's friends [the clone makers] are able to take hold in the market."

Colony disagreed. IBM, he said, is likely to introduce a high-end 80286-based Personal Computer, one more powerful than the AT. But, he added, the AT itself is no flash in the pan.

Meanwhile, back in the jungle, the makers of AT compatibles are waiting for a chance to pounce on the share of the AT market that IBM fails to gobble up. But, they wait uneasily.

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Intel's 80286 chip: A cut above

While it may run most of the software written for its older brother, the Intel Corp. 80286 microprocessor is a world apart from the Intel 8088 microprocessor that powered the IBM Personal Computer to market dominance.

For one thing, the 80286, upon which the Personal Computer AT and compatibles are based, contains over 100,000 transistors, the basic building blocks of a microprocessor. The Personal Computer's 8088 contains 29,000 transistors.

The 80286 also features a faster timing speed, a 16-bit data bus — the Personal Computer has an 8-bit bus — and handles data by pipelining it. In pipelining, the 80286 handles data retrieval, decoding and execution in separate chambers arrayed sequentially.

As the next instruction is retrieved from memory, the instruction previously retrieved is decoded in the pipeline's midsection, and the instruction just decoded is executed at the pipeline's end.

All together, these features spell speed; the AT reportedly is two to three times faster than the Personal Computer.

Beyond speed, the 80286 chip includes such other features as the ability to operate as a true multiuser processor and the ability to address up to 16M bytes of memory.

It can also partition some of that additional memory into a virtual disk, from which data can be retrieved almost instantly.

The 80286 is not without its problems, however.

Digital Research, Inc. has said that it found an incompatibility between its forthcoming Concurrent DOS-286, an operating system for the 80286, and the chip on which it will run.

According to a Digital Research spokesman, Intel has acknowledged the problem and will begin deliveries of a corrected version of the chip, perhaps as early as this year.

Intel is otherwise understandably proud of the microprocessor. In the company's annual report, the 80286 is referred to as "a stunning technological and financial success."

— Edward Warner

AT from page 1

have found their prayers for more storage answered by the enhanced version of the AT, which includes a 20M-byte disk. Of the roughly 200 Personal Computer ATs that his department has placed with users, 95% of them have been enhanced ATs.

Graffeo said Home Insurance is using Personal Computer ATs, rather than any of the AT compatibles announced in recent months, simply because IBM was the first to offer such a machine. The AT debuted in August 1984, and it was not until March 1985 that the first of the compatibles, the Kaypro Corp. 286i, arrived. Since then, at least a dozen others have premiered.

The compatible makers know from the history of the IBM Personal Computer that being a simple look-alike, without added value, will get them nowhere. Compaq Computer Corp., the most successful Personal Computer-compatible maker, is seen by analysts to have ensured the success of two AT compatibles by offering greater speed than the AT and optional built-in tape backup. Other AT compatibles, such as Texas Instruments, Inc.'s Business-Pro, have emphasized expandability, and still others, such as the 286i, push their prices (see story page 14).

The stark reality facing the clone makers, however, is that corporate users who once braved reports of faulty AT hard disks and waits of up to several months still want to get their hands on a Personal Computer AT (CW, Dec. 17). According to a survey by Newton-Evans Research Co., an Ellicott City, Md., research firm specializing in the computer industry, 85 out of 91 businesses using personal computers planned to buy additional micros this year — from IBM — and four out of five wanted at least one AT.

Although most ATs are in use as fast, high-storage stand-alones, some pioneers are taking the machine into new territory, a region where the distinction between micro and mini blurs.

For example, New York Commodity, a small New York import/export firm, acquired its sole AT specifically for multiuser operation, according to Marcia Kaufman, the secretary who oversees the computer's use. The machine will be used to support two additional users on terminals, the maximum that PC Xenix allows on the AT. Kaufman said the company had hoped to have the machine running six months ago but that projection was stymied by a lack of off-the-shelf Xenix software. A part-time programmer has been hired to develop software specifically for the firm.

The AT's 20M-byte disk also makes the machine attractive for another use often served by a mini — acting as file server to a local-area network. The headquarters of both Merrill Lynch in New York and Manufacturers Life Insurance in Toronto are testing ATs as part of their shakedown tests of an IBM PC Network-based local-area network. The Manufacturers Life local-area network supports two ATs, four Personal Computer XTs, a Hewlett-Packard Co. Laserprinter and an HP plotter. The Merrill Lynch local-area network uses the AT as its central server, accompanied by a 10M-byte Bernoulli Box cartridge disk drive system from Iomega Corp.

One way in which the AT and its brethren have yet to rub elbows with minis, though, is in internal memory. Although the chip can address up to 16M bytes of memory, IBM's PC-DOS limits the AT to addressing directly no more than 640K bytes. PC Xenix can support more than 1M byte of RAM, but users have not rushed to use it.

Those who develop software for PC-DOS, meanwhile, are awaiting the release of PC-DOS 4, reportedly planned for next year. Expected somewhat earlier is Digital Research, Inc.'s Concurrent DOS 286. Both operating systems reportedly will support multitasking and multiuser capability for PC-DOS applications — as well as a breakthrough of the 640K-byte barrier. When that barrier falls, developers, such as Richard Rabins, president of Alpha Software Corp., said they expect to use 80286-based machines with hard disks running futuristic software packages using artificial intelligence technology.

Until then, much of the power inherent in the AT and its compatibles will remain untapped.

Standard Machine									
Compaq Computer Corp.	Deskpro 286	8/6	256K	One 1.2M	5	One parallel, one serial	Available now	$4,244
	Portable 286	8/6	256K	One 1.2M	3	One parallel, one serial	Available now	$4,499
IBM	Personal Computer AT	6	256K	One 1.2M	7	None included	Available now	$3,995
Kaypro Corp.	286i	6	512K	One 1.2M	7	None included	Available now	$2,995
Televideo Systems, Inc.	Televideo AT	8/6	256K	One 1.2M	8	One parallel, one serial	July	$3,295

Model	Memory (in bytes)	Diskette Drives (in bytes)	Hard Disk Capacity (in bytes)	Open Slots	Ports	Additional Users Supported	Shipping Date	Price	Comments
Portable 286	640K	One 1.2M	20M (unformatted)	2	One parallel, one serial	None	Available now	$6,299	Transportable; 9-in. monitor
Personal Computer AT	512K	One 1.2M	20M (formatted)	6	One parallel, one serial	2	Available now	$5,795	Top of the Personal Computer line; introduced in November 1984
286i	640K	One 1.2M	20M (unformatted)	7	One parallel, one serial	8	Available now	$4,795	First of the AT compatibles
Televideo AT	512K	One 1.2M	20M (formatted)	7	One parallel, one serial	None	July	$4,795	Monochrome monitor included

CONTROL!

AT compatibility hinges on hardware

Compatibility with the IBM Personal Computer AT is not just a question of the read-only memory (ROM) Basic I/O System (Bios), according to a spokesman for a supplier of compatible systems software.

In addition to Bios, which acts as an assistant to the operating system, a compatible maker needs to copy the basic layout of the Personal Computer AT's internal hardware, including the motherboard, according to Richard Levandov, marketing vice-president at Phoenix Software Associates Ltd. Systems software compatibility can be obtained through porting Microsoft Corp.'s MS-DOS operating system and other systems software, he continued.

A Norwood, Mass., firm, Phoenix Software has made a business of what Levandov called "emulating the IBM [Personal Computer] environment," and 15 of the AT-compatible makers have licensed the Phoenix ROM Bios alone.

Systems software modifications are essential, Levandov explained, because compatible makers receive only an OEM adaptation kit without the machine-dependent portions of the operating system when they buy an MS-DOS license from Microsoft.

For hardware compatibility, Phoenix licenses designs for a motherboard and advises clients on how to complete a basic hardware layout — which is harder than it sounds.

Levandov likes to tell of how the president of a personal computer manufacturer called recently to say that his company had just run off 500 AT-type motherboards and now wanted to pick up Bios to cinch their compatibility.

"I said, by the way, did you use the [National Semiconducter Corp.] 80250 communications controller?" Levandov recalled. "That gets them every time. He said, 'Oh, no, we used the [Signetics Corp.[8251.' I said, 'That means that [Lotus Development Corp.'s[Symphony's not going to run, [Microstuf, Inc.'s] Crosstalk's not going to run, [Hayes Computer Products, Inc.'s] Micromodem software's not going to run.' "

The best-known issue of compatibility, however, remains Bios. IBM defends Bios well, as evidenced by the successful copyright infringement suits it brought against Eagle Computer, Inc. and Corona Data Systems, Inc., both makers of Personal Computer compatibles.

As Levandov explained it, Phoenix had a head start on development of its AT ROM Bios because it was able to use a lot of the code from the Bios it had developed for the Personal Computer.

As with the development of its Personal Computer-compatible Bios, Levandov said, the AT-type Bios was written by four programmers who had not seen IBM's published Bios specifications. The programmers were given a list of what Phoenix Bios should do, and when they finished, their work was compared with the IBM specifications to make sure it was sufficiently different, he said.

In the end, the pursuit of compatibility turns upon itself: The AT is not totally compatible with the Personal Computer line. The microprocessors used in the Personal Computer and in the AT operate at differing clock speeds and their architectures use 8-bit and 16-bit data buses, respectively. Only two of the card slots in the AT's expansion chassis support the 8-bit bus of the Personal Computer, thus limiting the number of Personal Computer cards that can be inserted into the AT.

The greater compatibility question, though, is one of software. Early in the AT's life, there were several popular programs, including Ashton-Tate's Framework, that did not run on the machine. Since then, most software developers have issued AT-compatible versions of their programs as necessary.

Other programs, such as Datasheet from Interactive Data Corp. of Waltham, Mass., lose some functionality when running on the AT. Datasheet user George Mellman, a Merrill Lynch Pierce Fenner & Smith, Inc. executive in Boston, said he relied on Datasheet for analyzing stocks on the Personal Computer. He said he found that on the AT the software will not transfer files to his Lotus 1-2-3 spreadsheet. Datasheet, he said, is "really useless on the AT."

— Edward Warner

Software developers steer clear of IBM AT

Although the IBM Personal Computer AT was greeted by the cheers of corporate users craving speed for their spreadsheets, the machine holds other potential, particularly the ability to run programs in up to 16M bytes of random-access memory (RAM).

That potential remains largely untapped, and the situation may not change anytime soon because many important software firms have held off on developing packages specifically for the AT.

According to developers, the lion's share of the problem stems from the AT's operating system, IBM's PC-DOS 3.1, which will not work in the AT's protected address mode, the machine's gateway to what can become up to 16M bytes of RAM.

PC-DOS is limited to addressing directly no more than 640K bytes of RAM. In addition, according to consultant Alan Finger, president of Cytek, Inc. of Andover, Mass., PC-DOS "takes advantage of nothing in the [Intel Corp. 80286]" chip on which the AT is based, including the ability to support multitasking and multiuser operation at the chip level.

Developers could still write PC-DOS applications that use the protected address mode, but the applications would run so sluggishly on the AT that they would be useless, said Mike Loftus, systems software marketing manager for Digital Research, Inc. The sluggishness, he elaborated, would arise because "the [PC-DOS] calls would have to be handled by an exception handler" that would spend considerable time routing calls to the proper location.

Developers who write applications that run slowly on the AT but address its larger memory would encounter an additional problem. The AT, in their view, is not selling well enough to warrant going out on such a limb.

IBM, as always, is releasing no sales figures, but analyst George Colony, president of Forrester Research, Inc., estimates that between 200,000 and 230,000 ATs will be sold this year. Colony, however, predicts that all Personal Computers to come out of IBM in the next year will use the Intel chip.

Until that actually happens, Richard Rabina, president of Alpha Software Corp., said he believes it "could be dangerous" for developers to write programs that only run on the AT. At Bellevue, Wash.-based Microrim, Inc., President Wayne Erickson agreed, saying, "We really try to avoid things that, from a hardware standpoint, limit our market."

Neither Microrim, the developer of the Rbase 5000 data base management package, nor Alpha Software Corp., publisher of the Electric Desk integrated package, nor Forefront Corp., author of Ashton-Tate's Framework integrated package, are doing development work for the AT-class machines, the companies said.

That could all change, however, with the release of a new version of PC-DOS, expected to be called Version 4, or with the arrival of Digital Research, Inc.'s (DRI) forthcoming Concurrent DOS-286 operating system. Both operating systems reportedly will debut in the next 12 months and are expected to support the additional addressable memory on the AT in addition to such functions as multitasking, according to DRI's Loftus.

Concurrent DOS-286, he said, will let users run PC-DOS applications in the AT's protected mode. Concurrent DOS-286 will ship to OEMs, such as AT-compatible makers and software developers, in the fourth quarter. Microsoft, meanwhile, declined comment on any products it might have under development.

Were the 640K-barrier to fall and high-memory, high-speed applications to become possible, developers might begin using such memory-hungry technologies as artificial intelligence, according to Robert Firmin, president of Javelin Software Corp. Such AI-based software, the Cambridge, Mass., software developer said, could include expert systems and a new generation of easy-to-use software that adjusts to the skill level of the user.

For an idea of what that future would be like, consultant Finger suggested that one "picture [Lotus Development Corp.'s] 1-2-3 with 1G byte of address space [in virtual memory]."

— Edward Warner

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NEWS

NBS releases standards for managing password security

By Mitch Betts
CW Washington Bureau

GAITHERSBURG, Md. — Horror stories about security problems with computer passwords abound, from anecdotes about passwords taped to terminals to a case where a computer had the same password (test) that it had when it was uncrated years before.

But government researchers say that, despite the horror stories, passwords can provide ample security if managed and handled properly.

The National Bureau of Standards (NBS), through its Institute for Computer Science and Technology, recently completed a two-part publication that provides guidance on password systems. One part is a mandatory standard for federal agencies — the Federal Information Processing Standard 112 — which sets minimum requirements; the appendix provides guidance for additional security.

> ❝
>
> *Government researchers say that passwords can provide ample security if managed and handled properly.*

"While the effectiveness of passwords has often been questioned, primarily because they can be easily forgotten or given to another person, they can provide reasonable deterrence to unauthorized access if properly handled by [users] and if properly stored and processed in the password verification system," the NBS document said.

The NBS recommended that the computer security officer develop a comprehensive program that covers 10 components of a password system:

- Composition.
- Length.
- Lifetime.
- Source.
- Ownership.
- Distribution.
- Storage.
- Entry.
- Transmission.
- Authentication period.

The federal standard provides only a bare minimum of security, the NBS document indicated. For example, it requires the following:

- Passwords must be at least four characters long and composed from a set of at least 10 characters — such as the digits 0 through 9.
- Passwords must have the shortest practicable lifetime, with a maximum lifetime of one year.
- Any passwords included in a new system when it is delivered, transferred or installed must immediately be changed.
- Users who create or select their own passwords must be instructed to select a randomly generated password or to select one that is not related to their personal identity, history or environment.
- Personal passwords must be distributed in such a way that only the intended owner may see or obtain it.

The stringency of the requirements in each category should match the sensitivity of the computer system's data, the NBS document stressed.

The standard accommodates the use of four-digit personal identification numbers (PIN) for financial transactions, but the NBS document warned that a PIN "can be found in a few minutes" by a hacker. A better composition, the NBS said, has the letters A, B, C, D, E, F and the 10 digits. Passwords made of all letters encourage users to select names, nicknames or other common words.

In theory, the longer the password, the better. But the NBS acknowledged that longer passwords take longer to enter, have more chance of error when being entered and may be more difficult to remember.

"The length range should include a number of lengths, probably five to eight characters, and the composition should be a large set so that a high level of security can be provided easily," the NBS concluded.

The NBS warned that the security officer should not require that the password for each user be unique.

The guidelines also advised against the use of random-number generators commonly available in statistical software, because the sequence of the random numbers they generate is predictable.

When passwords are distributed to users in writing, the user should be instructed to memorize it and then destroy it or return the written password to the security officer with a signed receipt, the NBS said.

Preventing someone from seeing a password as the user types it is a difficult task, the NBS conceded. The NBS suggested several remedies, from masking the password on the screen to having the user shield the keyboard from view.

Copies of the NBS document, "Federal Information Processing Standards Publication 112, Password Usage," can be ordered from the National Technical Information Service, Springfield, Va. 22161.

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DIGITAL'S NEW LN03 IS FAST AND AFFORDABLE.

Until now, laser printers fell into the category of pure science fiction for most applications. Those that could handle even a modest work load cost more than the moon and stars. And those that were affordable just couldn't keep up with a busy office.

Now there's Digital's new LN03. The most productive laser printer you can buy for less than $7000. A lot less. In fact the LN03 costs little more than half that. Yet it leaves every laser printer in its price range in the dust.

For pure speed, nothing in the price range can beat the LN03. At 8 pages per minute – or 333 cps – it can handle the volume of a busy office with ease.

It also prints true compound documents, with business graphics and text on the same page, in a single pass. And it prints on virtually any cut sheet paper, including overhead transperencies. All of which makes it ideal for almost any multi-user environment.

IT WON'T WASTE YOUR TIME.

The LN03's real edge in speed and productivity comes from its paper handling capacity. With 250 page input and output trays, the LN03 can print thick documents – pre-collated – without reloading. Try that with any other laser printer in the class and someone will end up changing the paper 10 times or more, reverse collating every page by hand, and babysitting the entire process. Which is counter-productive to the whole idea of office automation.

BETTER QUALITY THAN LETTER QUALITY.

The LN03 also gives you advantages over daisywheel and dot matrix printers, too. Because one LN03 can do the job of the two conventional printers you're probably using now.

In fact it can do *more* than *both*. For a lot less money.

For starters, it forms characters precisely with 300 x 300 dot resolution. Characters that are not only far cleaner than your dot matrix printer, but even better than your letter quality printer. You may actually have trouble telling the difference between text that's been printed on the LN03 and text that's been professionally typeset. In fact the LN03 characters are so well formed, they're recognized by Optical Character Readers with no problem at all.

To give your documents a professional appearance, the LN03 lets you pick and choose from a virtually unlimited variety of typefaces, sizes and styles. And they've all been developed especially for the LN03 by Compugraphic Corporation, the world's recognized authority on computer-generated typefaces.

Two resident typefaces give you no fewer than 16 different sizes, styles and pitches, while optional ROM cartridges let you add just about any face or font you might consider. Including your own custom designed faces. You can even down-line load your own character set or custom-designed graphics fonts to print your logo, letterhead or forms. If you like, the LN03 can print sideways, down the length of the paper as well as across, to accommodate spreadsheets, compiler listings, graph captions or other special effects.

In short, the LN03 gives you a remarkable combination of print quality and versatility. So every piece you print makes a great impression.

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FASTER AND MORE PLEASING THAN DOT MATRIX.

The LN03 doesn't stop with better-than-letter-quality quality. It also gives you the advantages of dot matrix printing. And then some.

At 8 pages per minute, the LN03's speed approaches that of a line printer. The fact is, it's faster than both your dot matrix and daisywheel printer working together.

Crisp business graphics are a snap. And unlike either of your conventional printers, the LN03 can mix graphics and true letter quality on a single page. In a single pass.

Noise is a barely audible 55 dB. Far quieter than any impact printer. No louder than your copier. So the LN03 won't distract and annoy workers even in an open office.

The LN03 will even make transparencies for overhead projectors. Try that on any of your printers.

Finally, the LN03 is one of the least expensive printers you can own, with a cost-per-page of just 3.2 cents. That's a savings of 20% or more over dot matrix printing. And substantially more compared to your daisywheel printer.

So, an LN03 really makes a lot of sense. You get better economy. More flexibility. Additional capabilities. A professional look. Which makes the LN03 the most productive printer you can buy for the money.

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The LN03, like every Digital hardware and software product, is engineered to conform to an overall computing strategy. This means our products are engineered to work together easily and expand economically. Only Digital provides you with a single, integrated computing strategy from desktop to data center.

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DATAPRO from page 1

buy, as opposed to rent or lease, their systems. That trend was a slight increase for some groups of users, but a more dramatic increase for others. For example, in Datapro's 1984 survey, 50.54% of IBM users polled said they purchased their systems, while 49.46% either rented or leased systems. In 1985, 52.52% said they purchased their systems, while 47.51% either rented or leased. Users of NCR mainframes marked a more dramatic switch to purchasing hardware. In 1984, 53.19% purchased CPUs and 46.81% rented or leased. This year, 71.97% said they purchased their mainframes and 28.03% rented or leased them.

■ Nearly all the users polled were generally pleased with their systems. Asked whether their system did what they expected, an average of 96% of the users said it did. Furthermore, a strong majority said they would recommend their systems to others. In fact, some vendors seemed to make significant progress in improving users' opinions of their systems. For example, in 1984, 89.87% of Sperry mainframe users said they would recommend their system to others. This year, 98.33% were willing to make that recommendation.

> ***IBM's aging 3030 line of mainframes increasingly is being viewed as obsolete by users.***

■ IBM's aging 3030 line of mainframes increasingly is being viewed as obsolete by users. In 1984, 91.67% of users were willing to recommend 3030 series systems to others. This year, in the wake of IBM's newly announced 3090 series processors, only 71.42% of 3030 users were willing to recommend 3030s to others — the largest decline of any system line listed in the survey. Furthermore, in 1984, none of the users polled said they would not recommend the 3030 line. This year, 28.57% gave the 3030s a "no" vote — the most resounding "no" vote in the survey.

But while many IBM users appear to have written off the 3030 series, the 3090 announcement does not appear to have shaken users' confidence in IBM 3090 series processors.

The 3090 line, which many industry watchers believe will be severely affected by the 3090 line, still rated high marks. For example, 96% of 3081 users said they would recommend the system to others. Likewise, 98.73% of 3083 users and all 3084 users would recommend their systems.

■ Based on Datapro's overall satisfaction rating — a combination of categories including such factors as reliability, service, software and technical support — the major mainframe vendors are in a dead heat for keeping users satisfied. On the average, all the users polled rated their overall satisfaction with their systems as above average.

The Datapro report, titled "User Ratings of Computer Systems," costs $29.

The report is available from Datapro, located at 1805 Underwood Ave., Delran, N.J. 08075.

CALL FOR PAPERS

SEVENTH NATIONAL EDUCATIONAL COMPUTING CONFERENCE (NECC '86)
San Diego, June 4-6, 1986

People interested in participating in Necc '86 are invited to submit papers or proposals for sessions, workshops and projects.

The following are general areas of interest: computer science, computer engineering and information systems education; computer use in the physical sciences, mathematics, social sciences and humanities; curricula planning in computer science, computer engineering and information systems; national programs related to computers in education; computers in education at all levels; computer education for teachers; articulation of computer education with commerce, industry and government; health care and legal services computer education; hardware and software resources and their administration; computer-assisted testing and computer-managed instruction; computer literacy and societal impact; computers in educational research; computer education and job opportunities for the handicapped; administrative data processing in education; computer-based education; organizational dynamics in the computer-related professions; self-assessment programs and continuing education; accreditation and certification programs; and computer service courses and facilities.

Papers should be typed, double-spaced and are not to exceed 15 pages. Each paper should begin with an abstract of one page or less. Submit all program proposals and papers by Nov. 1, to Necc '86, University of San Diego, School of Education, Alcala Park, San Diego, Calif. 92110.

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Users rate the vendors . . .

Survey Item	[illegible]	106	[illegible]	581	[illegible]	132	[illegible]	17
Number of User Responses								
Average Life of System (in months)	[illegible]	9.6	[illegible]	9.3	[illegible]	9.9	[illegible]	12.9
Acquisition Method (%)								
Purchase	[illegible]	62.26	[illegible]	52.32	[illegible]	71.97	[illegible]	58.82
Rental or Lease from Manufacturer	[illegible]	18.87	[illegible]	12.02	[illegible]	12.12	[illegible]	29.41
Lease from Third Party	[illegible]	18.87	[illegible]	36.49	[illegible]	15.91	[illegible]	5.88
System Ratings[1]								
Ease of Operation	[illegible]	3.63	[illegible]	3.21	[illegible]	3.24	[illegible]	2.94
Reliability of Mainframe	[illegible]	3.51	[illegible]	3.70	[illegible]	3.39	[illegible]	2.71
Reliability of Peripherals	[illegible]	3.09	[illegible]	3.46	[illegible]	3.39	[illegible]	2.71
Manufacturer's Maintenance Service								
Responsiveness	[illegible]	3.38	[illegible]	3.47	[illegible]	3.31	[illegible]	2.71
Effectiveness	[illegible]	3.10	[illegible]	3.47	[illegible]	3.19	[illegible]	2.41
Manufacturer's Technical Support								
Troubleshooting	[illegible]	2.77	[illegible]	3.14	[illegible]	2.85	[illegible]	2.65
Education	[illegible]	2.78	[illegible]	3.05	[illegible]	2.95	[illegible]	2.44
Documentation	[illegible]	2.40	[illegible]	2.94	[illegible]	2.68	[illegible]	2.24
Manufacturer's Software								
Operating Systems	[illegible]	3.75	[illegible]	3.25	[illegible]	3.20	[illegible]	2.76
Compilers and Assemblers	[illegible]	3.35	[illegible]	3.29	[illegible]	3.15	[illegible]	2.71
Applications Programs	[illegible]	2.58	[illegible]	2.91	[illegible]	2.56	[illegible]	2.46
Ease of Programming	[illegible]	3.33	[illegible]	2.94	[illegible]	2.92	[illegible]	2.59
Ease of Conversion	[illegible]	3.22	[illegible]	2.83	[illegible]	3.09	[illegible]	2.50
Overall Satisfaction	[illegible]	3.35	[illegible]	3.19	[illegible]	3.05	[illegible]	2.41
Additional Ratings[1]								
Ease of Expansion	[illegible]	3.53	[illegible]	3.30	[illegible]	3.60	[illegible]	2.35
Compatibility of Hardware Carried Over from Other Systems	[illegible]	3.23	[illegible]	3.30	[illegible]	3.22	[illegible]	2.57
Compatibility of Programs Data Carried Over from Other Systems	[illegible]	3.22	[illegible]	3.23	[illegible]	3.36	[illegible]	2.35
Power and Energy Efficiency	[illegible]	3.26	[illegible]	3.26	[illegible]	3.02	[illegible]	2.43
Productivity Aids Helps Keep Programming Costs Low	[illegible]	2.83	[illegible]	2.68	[illegible]	2.71	[illegible]	2.18
Software Support Delivered by Vendor	[illegible]	2.63	[illegible]	2.88	[illegible]	2.55	[illegible]	2.31
Keeping Up with and Implementing Vendor Changes to Hardware and Software[2]	[illegible]	3.13	[illegible]	2.76	[illegible]	2.95	[illegible]	2.60
Delivery and Installation of Equipment[3]	[illegible]	2.92	[illegible]	3.05	[illegible]	2.95	[illegible]	2.94
Delivery of Required Software[3]	[illegible]	3.00	[illegible]	3.00	[illegible]	2.82	[illegible]	2.75
Did the system do what you expected it to do? (%)								
Yes	[illegible]	95.28	[illegible]	97.93	[illegible]	93.94	[illegible]	88.24
No	[illegible]	3.77	[illegible]	0.52	[illegible]	4.55	[illegible]	5.88
Undecided	[illegible]	0.94	[illegible]	1.55	[illegible]	1.52	[illegible]	5.88
Would you recommend the system to another user? (%)								
Yes	[illegible]	88.62	[illegible]	95.87	[illegible]	94.09	[illegible]	41.18
No	[illegible]	3.77	[illegible]	1.72	[illegible]	9.85	[illegible]	23.53
Undecided	[illegible]	9.60	[illegible]	2.24	[illegible]	6.06	[illegible]	35.29

[1] Ratings are from 4.0 to 1.0, with 4.0 high.
[2] Ratings are from 4.0 to 1.0, with 4.0 = very easy and 1.0 = very difficult.
[3] Ratings are from 4.0 to 1.0, with 4.0 = ahead of schedule and 1.0 = very late.

DATAPRO RESEARCH CORP. DAVARTS.

. . . and their mainframes

Survey item								
Number of User Responses	[illegible]	5	[illegible]	16	[illegible]	17	[illegible]	21
Average Life of System (in months)	[illegible]	5.8	10.8	9.6	[illegible]	8.9	[illegible]	9.4
Acquisition Method (%)								
Purchase	[illegible]	80.00	[illegible]	68.75	[illegible]	64.17	[illegible]	61.90
Rental or Lease from Manufacturer	[illegible]	0.00	[illegible]	12.50	[illegible]	5.88	[illegible]	14.29
Lease from Third Party	[illegible]	20.00	15.00	18.75	[illegible]	29.41	[illegible]	23.81
System Ratings[1]								
Ease of Operation	[illegible]	3.60	[illegible]	3.81	[illegible]	3.38	[illegible]	3.47
Reliability of Mainframe	[illegible]	3.60	[illegible]	3.81	[illegible]	3.25	[illegible]	3.42
Reliability of Peripherals	[illegible]	3.00	[illegible]	3.31	[illegible]	3.06	[illegible]	3.26
Manufacturer's Maintenance Service								
Responsiveness	[illegible]	3.20	[illegible]	3.50	[illegible]	3.29	[illegible]	3.24
Effectiveness	[illegible]	3.00	[illegible]	3.25	[illegible]	3.00	[illegible]	3.05
Manufacturer's Technical Support								
Troubleshooting	[illegible]	2.60	2.71	3.00	[illegible]	2.76	[illegible]	3.05
Education	[illegible]	3.00	[illegible]	2.75	[illegible]	2.71	[illegible]	2.71
Documentation	[illegible]	2.20	[illegible]	2.73	[illegible]	2.18	[illegible]	2.71
Manufacturer's Software								
Operating System	[illegible]	3.80	[illegible]	3.94	[illegible]	3.53	[illegible]	3.43
Compilers and Assemblers	[illegible]	3.80	[illegible]	3.38	[illegible]	3.24	[illegible]	3.43
Applications Programs	[illegible]	2.50	[illegible]	2.67	[illegible]	2.46	[illegible]	2.44
Ease of Programming	[illegible]	3.80	[illegible]	3.38	[illegible]	3.18	[illegible]	3.14
Ease of Conversion	[illegible]	3.20	[illegible]	3.27	[illegible]	3.12	[illegible]	2.95
Overall Satisfaction	[illegible]	3.40	[illegible]	3.60	[illegible]	3.18	[illegible]	3.33
Additional Ratings								
Ease of Expansion	[illegible]	3.80	[illegible]	3.44	[illegible]	3.47	[illegible]	3.62
Compatibility of Hardware Carried Over from Other Systems	[illegible]	3.20	3.47	3.31	[illegible]	3.06	[illegible]	2.81
Compatibility of Programs/Data Carried Over from Other Systems	[illegible]	3.20	3.44	3.25	[illegible]	2.94	[illegible]	3.00
Power and Energy Efficiency	[illegible]	3.60	[illegible]	3.56	[illegible]	3.06	[illegible]	3.20
Productivity Aids Helps Keep Programming Costs Low	[illegible]	3.20	[illegible]	2.69	[illegible]	2.71	[illegible]	2.75
Software Support Delivered by Vendor	[illegible]	2.60	[illegible]	2.63	[illegible]	2.59	[illegible]	2.60
Keeping Up with and Implementing Vendor Changes to Hardware and Software[2]	[illegible]	3.20	3.17	3.19	[illegible]	3.00	[illegible]	3.06
Delivery and Installation of Equipment[2]	[illegible]	3.40	2.76	2.94	[illegible]	2.94	[illegible]	3.10
Delivery of Required Software[2]	[illegible]	3.20	2.89	3.25	[illegible]	3.06	[illegible]	3.05
Did the system do what you expected it to do? (%)								
Yes	[illegible]	100.00	[illegible]	93.75	[illegible]	94.12	[illegible]	100.00
No	[illegible]	0.00	2.17	6.25	[illegible]	5.88	[illegible]	0.00
Undecided	[illegible]	0.00	[illegible]	0.00	[illegible]	0.00	[illegible]	0.00
Would you recommend the system to another user? (%)								
Yes	[illegible]	100.00	[illegible]	93.75	[illegible]	88.24	[illegible]	80.95
No	[illegible]	0.00	[illegible]	6.25	[illegible]	0.00	[illegible]	4.76
Undecided	[illegible]	0.00	[illegible]	0.00	[illegible]	11.76	[illegible]	14.29

[1] Ratings on a scale from 4.0 to 1.0, with 4.0 high.
[2] Ratings on a scale from 4.0 to 1.0, with 4.0 = very easy and 1.0 = very difficult.
[3] Ratings on a scale from 4.0 to 1.0, with 4.0 = [illegible] and 1.0 = [illegible].

Users rate their mainframes

Survey Item								
Number of User Responses	8		81		14		78	
Average Life of System (in months)	11.4		8.3		8.8		8.3	
Acquisition Method (%)								
Purchase	66.67		67.21		35.71		48.10	
Rental or Lease from Manufacturer	11.11		4.92		0.00		10.13	
Lease from Third Party	22.22		27.87		64.29		41.77	
System Ratings*								
Ease of Operation	3.00		3.12		3.25		3.31	
Reliability of Mainframe	3.67		3.78		3.50		3.69	
Reliability of Peripherals	3.56		3.62		3.25		3.46	
Manufacturer's Maintenance Service								
Responsiveness	3.33		3.53		3.25		3.46	
Effectiveness	3.22		3.46		3.29		3.56	
Manufacturer's Technical Support								
Troubleshooting	2.63		3.15		3.08		3.17	
Education	2.75		2.98		3.00		3.18	
Documentation	2.50		2.91		3.08		3.01	
Manufacturer's Software								
Operating System	2.89		3.17		3.43		3.38	
Compilers and Assemblers	3.22		3.21		3.57		3.37	
Application Programs	2.71		2.70		3.00		2.84	
Ease of Programming	3.00		2.84		3.00		2.99	
Ease of Conversion	2.67		2.78		3.18		2.93	
Overall Satisfaction	3.00		3.10		3.29		3.31	
Additional Ratings								
Ease of Expansion	3.00		3.20		2.50		3.64	
Compatibility of Hardware Carried Over from Other Systems	3.00		3.18		3.29		3.43	
Compatibility of Programs/Data Carried Over from Other Systems	2.56		3.12		3.23		3.35	
Power and Energy Efficiency	2.89		3.22		2.14		3.34	
Productivity Aids Helps Keep Programming Costs Low	2.89		2.55		2.92		2.72	
Software Support Delivered by Vendor	2.11		2.93		2.93		2.87	
Keeping Up with and Implementing Vendor Changes to Hardware and Software*	2.67		2.75		2.62		2.78	
Delivery and Installation of Equipment*	2.89		3.03		3.00		3.05	
Delivery of Required Software*	2.78		3.00		2.93		3.00	
Did the system do what you expected it to do? (%)								
Yes	100.00		100.00		92.86		100.00	
No	0.00		0.00		0.00		0.00	
Undecided	0.00		0.00		7.14		0.00	
Would you recommend the system to another user? (%)								
Yes	88.89		98.72		71.43		98.73	
No	0.00		1.64		28.57		0.00	
[illegible]	11.11		[illegible]		[illegible]		[illegible]	

5	16	17
6.2	9.3	12.8
40.00	50.00	58.82
0.00	31.25	29.41
60.00	18.75	5.88
3.60	3.25	2.94
3.80	3.44	2.71
3.60	3.07	2.71
3.60	3.50	2.71
3.40	3.44	2.41
3.20	2.88	2.65
3.50	2.63	2.44
2.25	2.44	2.24
3.50	3.44	2.76
3.00	3.31	2.71
0.00	2.62	2.46
3.00	3.13	2.50
3.50	2.93	2.50
3.50	3.25	2.41
3.60	3.60	2.35
3.60	2.73	2.57
3.60	2.38	2.35
3.40	2.81	2.43
3.33	2.81	2.18
2.80	2.88	2.31
3.00	2.88	2.60
3.00	3.25	2.94
3.00	3.13	2.76
00.00	100.00	88.24
0.00	0.00	5.88
0.00	0.00	5.88
00.00	100.00	41.18
0.00	0.00	23.53

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E-X

Software AG Users spell it out...Datapro™ survey rates ADABAS

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CS0710

Urisa announces six winners of 1985 Esig awards

By Susan Raimondi
CW Staff

MCLEAN, Va. — The Urban and Regional Information Systems Association (Urisa) has granted six Exemplary Systems in Government (Esig) Awards for 1985.

Winners of this year's awards include the following:

■ New York, for its Street Lighting Interactive Maintenance system, which identifies and consolidates multiple complaints from the same location; determines the contractor responsible for the repair; and groups work orders by geographic proximity. The system, which was said to have increased the efficiency of work crew dispatching and resulted in significant annual savings to the city, was a joint development by the city's departments of General Services and City Planning.

> *The awards were based on a system's benefits to both government and citizens and its sophistication.*

■ San Diego's Water Utilities Department, for an automated Work Assignment Order system that was said to have streamlined the work of the water department, which is responsible for operating, maintaining and repairing mains, valves, pump stations and other facilities.

■ Ottawa's Lands Directorate, for the 20-year-old Canada Land Data Systems geographic information processing system, which, according to Urisa, was designed with such foresight that it has prospered under the direction of a number of different agencies and ministries over the years. The system is said to improve continually and evolve to meet a broad range of data analysis and resource management applications well beyond the original expectations.

■ Dallas — a city that issues more than 60,000 building permits per year — for a building inspection system that allows home owners or contractors to use their tone-generating telephones as data entry terminals to request a building inspection any time of the day or night. The system, developed by the city's Department of Data Services, links the city's mainframe computer with the public telephone network.

■ Fort Collins, Colo., for using handheld meter reading devices to reduce reading-to-billing time and to produce management reports. At the end of the workday, the reading device is brought to the computer department and electronically attached to the computer system to transfer the information to a computer file. This is a special award given in recognition of the efforts of a small city in the use and application of computer technology in the workplace.

■ Toronto, for a Central Property Register that contains 12 files ranging in scope from information describing taxes and ownership to information on the number and species of city-owned trees.

All of the information files are accessible on-line through the use of the street or municipal address.

The awards — given out annually by Urisa — were based on a system's benefits to both government and citizens and a system's sophistication in light of previous accomplishments in the field, according to a Urisa spokesman.

The winners were chosen from a group of 28 submissions from the U.S. and Canada, according to the spokesman.

The awards will be presented July 31 at Urisa's annual conference to be held in Ottawa.

Additional information can be obtained from Urisa, Suite 300, 1340 Old Chain Bridge Road, McLean, Va. 22101.

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MCI rate restructuring cuts cost of calls over 200 miles

WASHINGTON, D.C. — MCI Communications Corp. recently announced that it will restructure its analog private-line rates, effective Sept. 1. The new rates will mean price reductions for users of the service where distances exceed 200 miles. The reductions will apply to the portion of service supplied by MCI.

The reductions range from 2% on a 220-mile circuit to 34% on a 2,000-mile circuit. Rates on circuits less than 200 miles will rise an average of 4%, MCI said. Overall, the company said, its private-line analog service rates will drop by 12%.

At the same time, MCI said, it will itemize price components to show the cost of local connections. MCI said this change will permit users to choose between arranging for their own local access to MCI's private line or having MCI arrange it.

MCI said that it will price its private-line rates an average of 10% less than the rates of its major competitor, AT&T Communications, for circuits of more than 250 miles. MCI said it has 1,500 users of its private-line service.

MCI also announced that users of its electronic mail service — MCI Mail — will now be able to access the service through Tymnet, the public packet-switching subsidiary of McDonnell Douglas Corp., at a rate of 5 cents per minute of connect time.

According to J. Robert Harcharik, MCI Mail's president, the Tymnet access feature will be available in 550 cities and will also offer users a 2,400 bit/sec. transmission speed in 50 cities.

He said that most MCI Mail users now access MCI Mail through the 800 Wats service, which costs 15 cents per minute.

VDT draft standards released

By Mitch Betts
CW Washington Bureau

SANTA MONICA, Calif. — A draft standard for VDT workstations was recently drawn up by an organization of ergonomics professionals here for eventual consideration as an official American National Standards Institute (Ansi) standard. The standard was released for a three-month public comment period by the Human Factors Society here.

The draft Ansi standard for "Human Factors Engineering of Visual Display Terminal Workstations," which is now subject to three months of public review and comment, covers the working environment of the VDT operator and the design of the workstation, the keyboard and the screen display.

For example, the 72-page draft standard would require the following:

- Adequate screen resolution and luminance and non-jittery displays.
- A contrast ratio between characters and background of at least 3:1 and characters that appear solid to the viewer.
- A minimum viewing distance of 12 inches and an angle between the line of sight and a line perpendicular to the screen less than or equal to 40 degrees.
- Chairs with back rests with lumbar support.
- A keyboard slope between zero and 25 degrees.

A copy of the draft can be obtained for $15 from the Human Factors Society, Box 1369, Santa Monica, Calif. 90406.

Public comments, due Oct. 1, should be accompanied by technical documents supporting the comments.

The Computer and Business Equipment Manufacturers Association (Cbema) has published a nontechnical guide to the draft standard, which can be obtained for $10 from Cheryl Bush at Cbema, 311 First St. NW, Washington, D.C. 20001.

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INFOTRON SYSTEMS

WORLD DIGEST
CW International News Network

TOKYO — Toshiba Corp. unveiled three mid-size and small office computers reportedly featuring enhanced image processing and a greater capacity for networking.

The models are known as Tosbac Q-600, Q-300 and Q-100 and offer integrated numeric, character and image data processing. They also feature accounting, spreadsheet and Japanese document applications that are simple enough for end users with no prior programming knowledge, the vendor said.

TOKYO — Memorex Japan Ltd. has announced its intent to enter the IBM System/38 plug-compatible business. According to a spokesman, the market — associated with data bases, Japanese Kanji character processing and distributed processing capability — is growing at a rate of 25% to 30% annually here. Memorex will market its 3680/3680-2 magnetic disk system, 3240 magnetic tape system and 1503/1511 line printers and terminals with shipments to begin in the third quarter.

BEIJING, China — The largest computer in Hewlett-Packard Co.'s current range of systems, the HP 3000 Series 68 minicomputer, will be assembled in China beginning in the fourth quarter. This was one item to emerge at the official opening of China Hewlett-Packard June 20, a $10 million joint venture between HP, China Electronic Import and Export Corp. and the Beijing Computer Industrial Corp.

BEIJING, China — "How to Succeed in Doing Business and Invest in the Chinese Electronics and Computer Industry" is the theme of a conference to be held in Hong Kong Sept. 12-13. The conference will be cosponsored by China Electronics Import and Export Corp., the Chinese Ministry of Electronics Industry and International Data Corp. Asia Ltd.

SHANGHAI — One-third of this city's installed microcomputers are not being used, according to a recent survey conducted by the Industry and Commercial Bank of China here. The survey revealed that annual micro sales are dropping by 42% because of a shortage of application software, a shortage of maintenance and training services and poor management.

MELBOURNE, Australia — Australian users went on a frantic buying spree during the last days of the federal government's 18% investment allowance, which ended June 30. Those companies reporting 300% sales increases for the month included Nixdorf Computer Corp.; Wicat Systems, Inc.; Wang Laboratories, Inc.; Ultimate Computer Services Corp.; National Advanced Systems Corp.; and Amdahl Corp.

Orders were taken up to the last minute Sunday night. Other firms also reported booming sales, with the exception of Control Data Australia, which claimed it had done little added business.

CARACAS, Venezuela — On June 21, the Finance Ministry of Venezuela abolished the requirement for import licenses on some computer equipment here. The requirement, in effect since December, resulted in a decrease in data processing activity in this country.

At the same time, import duties on units up to 640K bytes have been increased to 15%, compared with 1% paid by any other type of computer equipment. The latter move is thought to be in support of Venezuela's domestic development and production of microprocessors.

MUNICH, West Germany — The software and consulting industry here enjoyed double-digit growth percentages last year. The 15 largest firms' revenues grew an average of 17%, with 9% more employees than in 1983. Total revenue for the top 15 firms was $211 million.

Topping the list is Scientific Control Systems GmbH (SCS) of Hamburg, West Germany, with 700 employees. SCS was the only German company to pass "the 100 million Deutschmark mark."

STUTTGART, West Germany — The most important investment in the future is educating and retraining employees in the work force of today's world.

So concluded the recent "Human Factors in Manufacturing" conference held here, where the need for and consequences of automation were discussed.

International conference attendees argued that work performed in offices and factories can be accomplished more efficiently with new technology, but displacement of workers must also be expected.

FREISING, West Germany — Like its U.S. parent, Texas Instruments GmbH is anticipating a decline in revenue for 1985. During a recent press conference here, Norm Neureiter, TI vice-president, blamed the drop on a "panic situation" during which many firms tried to adjust quickly to an explosive demand by dropping prices.

The effect on the German subsidiary was the implementation of shorter workdays but no layoffs. In fact, the past year has seen more than 200 employees added to TI's Freising facility, bringing the total number of German employees to 1,400.

FRANKFURT — Although Wang Deutschland GmbH expects to post losses for the fourth quarter of this business year, the company will not post losses for the entire year.

According to Dieter Basista, Wang Deutschland's general manager, the European computer market enjoyed a growth rate of 30% during the past business year, unlike in the U.S., where the market is relatively flat.

Given the U.S. high-tech slump, Basista suggested that European subsidiaries should be exercising greater clout with their American parents. With their present success rates, he contended, it might be an opportune time for foreign subsidiaries to push through some European ideas.

Wang's own European subsidiaries reportedly account for 15% to 20% of the U.S. company's total revenue, he said, with firms in France, Germany and England making up 60% of that business.

Basista also noted that Wang Deutschland was exercising caution in hiring to avoid the layoffs now plaguing its American parent.

PARIS — A European cooperative to develop strategic military components is part of a high-tech program launched recently by France's President Francois Mitterand. Four companies will take part in the project: Siemens AG, Thomson, General Electric Co. and N. V. Philips Gloeilampenfabrieken. Their work will focus on advanced microprocessors, gallium arsenide components, microwave components, high-density memory chips, flat panel displays and sensors.

STOCKHOLM — According to research conducted by market research firm International Data Corp., Telefonaktiebolaget L. M. Ericsson has squeezed past Luxor Computers for the No. 2 spot in the race for personal computer sales here. The study projects continued growth for the personal computer market here, which is presently being dominated by IBM.

FRANKFURT — Commodore Business Machines GmbH warned consumers of imitation Commodore 64 computers and peripherals. The machines are appearing with increasing frequency here at less expensive prices than authentic Commodore equipment.

The disadvantage to the consumer, Commodore maintained, is that the imitation, primarily imported machines do not conform to Commodore standards and do not include the needed authorization from the German Postal Telephone and Telegraph authorities for communications expansion.

SYDNEY, Australia — During a time when Australia is experiencing a severe DP manpower shortage, Sydney University here has slashed its admissions of computer science students due to an administrative bungle. The computer science department admitted that demand for courses had been growing at 10% annually over the past several years, but resources had not been allocated properly and have fallen steadily. The university has recognized the problem but is unable to divert funds quickly to the department, the spokesman said.

STOCKHOLM — Three "tele-cottages" will be opened in remote regions of northern Sweden. The four-year project is intended to familiarize Sweden's population with computer technology. The centers are completely funded by the Swedish Postal Telephone and Telegraph agency.

CANBERRA, Australia — The Australian Tax Office has refused to pay $2 million for equipment from Time Office Computers Pty. Ltd. The commissioner for taxation reportedly ordered that no invoices be paid to Time due to the unsatisfactory ergonomic design of Time's 6000 series terminal.

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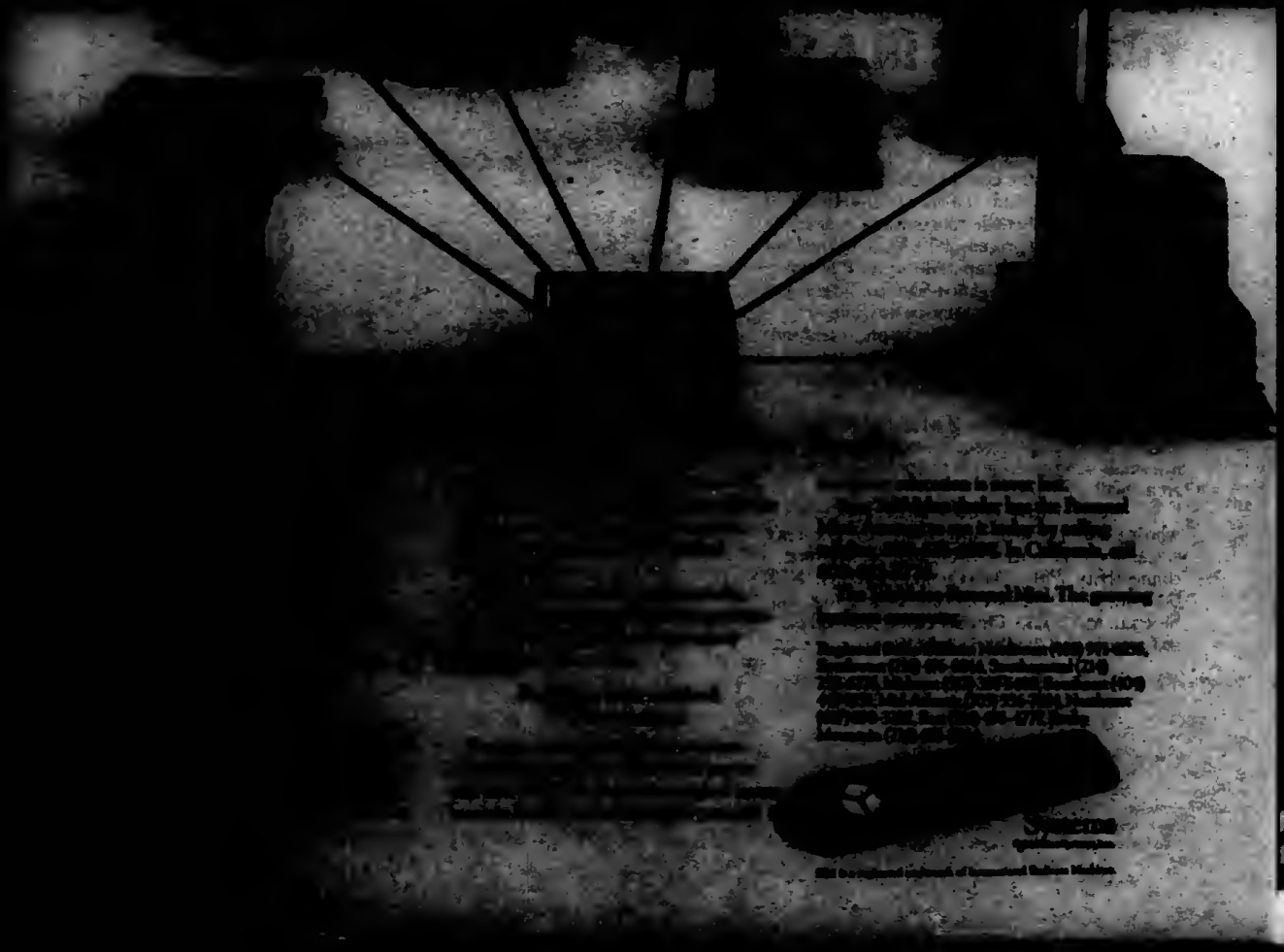


Congress steps up role in federal automation projects

Legislation grants more budgetary power

By Mitch Betts
CW Washington Bureau

WASHINGTON, D.C. — Committees of the U.S. Congress have started to exercise more control over the electronic filing and automation projects that are sprouting up in many U.S. government agencies.

In the last few weeks, congressional committees have passed legislation providing themselves with more budgetary power over the automation projects and have held hearings to explore the broader public policy issues surrounding the projects. For example, committees have done the following:

- The U.S. House Judiciary Committee required the U.S. Patent and Trademark Office (PTO) to fund the office's automation project from regular congressional appropriations rather than from off-budget methods, such as through user fees and barters.
- Likewise, the House Energy and Commerce Committee required the Securities and Exchange Commission (SEC) to use on-budget financing for its electronic filing pilot project and warned that congressional approval will be required for full-scale operation of the system.
- The House Subcommittee on Government Information, Justice and Agriculture held hearings on automation projects at the SEC, the Federal Maritime Administration, the Food and Drug Administration, the Department of Agriculture and the Bureau of the Census.

The automation projects vary considerably, ranging from the SEC's so-called Edgar system for electronic filing and retrieval of business documents to systems that put news releases and statistics on electronic bulletin boards.

Supports automation projects

Rep. Glenn English (D-Okla.), chairman of the House Subcommittee on Government Information, said he generally supports automation projects because they have "great potential to make government more efficient and government data more widely available."

But English and other members of Congress have expressed concern about how the automation projects will be operated, who will control the data, who will pay the bill and how private sector information vendors will be treated.

"I don't expect to be told that automation is so wonderful that the details are not important," English said.

Competition with existing vendors

For example, at a hearing on June 26, English explored the prospect that the Federal Maritime Commission's (FMC) proposed electronic filing system could compete with existing information vendors, such as the electronic tariff services run by the Journal of Commerce, Inc. of New York, and Transax Data Corp. of Falls Church, Va.

James J. Carey, vice-chairman of the maritime commission, said a forthcoming feasibility study will determine whether the commission will build its own automated tariff system or will contract with an existing vendor.

Carey and the vendors agreed that automation is inevitable.

Many shippers prepare their rate tariffs on word processing equipment and send paper copies to the FMC; then, information vendors return it to computer format for sale, Carey explained.

"We're the paper roadblock in the middle of this whole chain," Carey said.

Task force review

The maritime commission vice-chairman said a task force is carefully considering the issues English has raised about electronic filing systems [CW, Oct. 8].

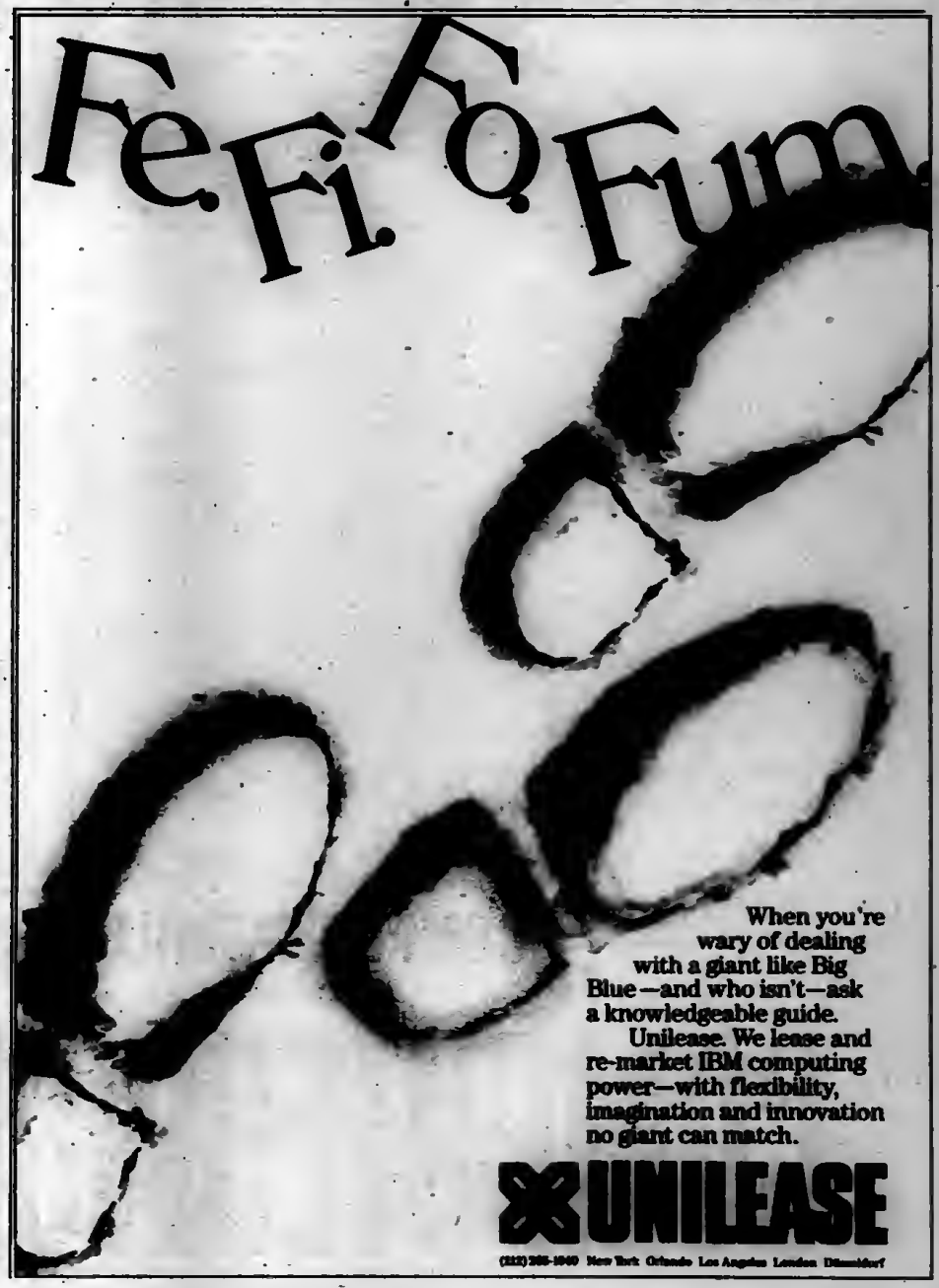
The House Energy and Commerce Committee cast a more critical eye on the SEC's Edgar system after two subcommittees found that the agency had made significant management and procurement mistakes [CW, March 25].

In its SEC authorization bill, the energy committee said the SEC failed to get adequate public participation in development of the project, failed to consider all relevant policy issues and made questionable procurement decisions.

Similar to the energy committee's assessment, the House Judiciary Committee's PTO authorization bill said the General Accounting Office had criticized the management of the project to automate the PTO's massive files of patents [CW, Dec. 3].

The report asserted that the PTO had failed to analyze user needs thoroughly or assess the project's cost-effectiveness and had circumvented congressional oversight by using off-budget financing techniques.

In requiring on-budget financing, the report said, the panel acted on "the theory that unless the [PTO] has to justify fully the obtaining of appropriated monies for development of an automation plan, the automation activites will not receive adequate congressional review."



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August 26

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NEWS

TURNAROUND TIME
Larry Long

***Q** I hold a second-level DP management position in a Fortune 500 company. Marginal people in our department are being released, and the good people have already left or are looking for jobs. The company has not been profitable for several years, and the outlook for the future is bleak.*

My family is encouraging me to find another job. The headhunters tell me that they could place me in an equal or better position within three months. I would appreciate any insight you might have on my situation.

If others around you, especially top management, are trying to make a go of it, you might consider staying on. If your company emerges from the current difficulties as a leaner, stronger company, and you are an active participant in the turnaround, then you may be rewarded with a quantum career leap.

On the other hand, if top management appears more concerned with their pension benefits than a turnaround, as is so often the case, bail out.

***Q** How significant is the Certificate in Data Processing (CDP) within the computer industry? Is this the "industry standard?" Do you feel there will be state certifications in the near future that will override this title?*

How does a person study for this exam in order to pass it the first time? I took all five parts of the exam and failed all five, four of them by one wrong answer. I have six years of experience as an applications and systems programmer/analyst, worked through two study manuals and learned and memorized 700 example questions.

I've addressed various facets of the CDP and its merit on several occasions in the past. During the intervening period, it is my perception that the CDP has neither gained nor lost in acceptance or recognition.

All things being equal, most MIS managers will give the edge to a holder of the CDP. However, more than a few see the CDP as silly and a waste of time.

There is no industry standard, nor do I expect there to be one in the near future. It will take a series of publicly visible, catastrophic events before states begin to consider certifying MIS professionals.

When someone with six years of experience who undertakes a concerted study effort fails five out of five exams, this confirms what I have said in the past — something is wrong with the exams. People who have taken the exams have told me that the questions are often ambiguous and that the choice of answers can boil down to a matter of opinion where there may be no truly correct answer. I also found this to be the case.

When you take the exam again, use your experience and your analytical ability to select the response that you feel the exam sponsors want. The best strategy may be to combine your experience with common sense. Don't evaluate the alternatives too literally. Remember, there is not enough space in a multiple-choice format for the list of possible answers to include all of the exceptions.

***Q** My problem is headhunters. They have done me more harm than good. Some headhunters send resumes to every company they know. When the company finds that it has received the same resume from more than one headhunter, that firm automatically rejects the candidate to avoid headhunter disputes.*

I had asked the two headhunters with whom I had been working not to send a resume to a certain company because I had approached that company myself. Both headhunters sent resumes to that company, and the company told me to reapply after a year.

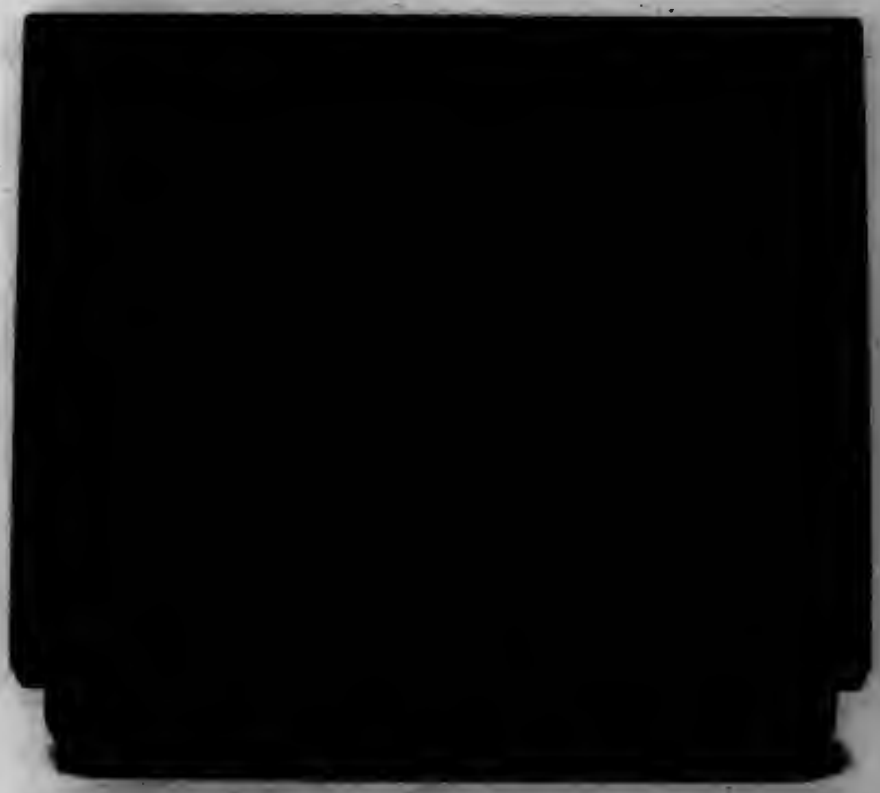
Eventually, I had to postpone my job search for a year. I did not use a headhunter when I resumed my search.

Is it reasonable to insist that a headhunter supply a list of companies contacted? I don't want one headhunter's letter to multiply one sent by another.

What you can request is a function of your relationship with the search firm. That relationship is negotiable, and it is up to you to lay out the ground rules. If you cannot agree, look elsewhere for a search firm. If you give them carte blanche to distribute your resume as they see fit, you should request a list of companies to which your resume has been sent. Certainly, if there are companies that you wish to be off limits, supply the search firm with the list and update it as needed.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question would like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

"Oh, you'll recognize me — I'll be a-smokin' on a big cigar."



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Combining the 32-bit MC68020, multiple auxiliary processors, and a tuned version of UNIX™ System V, the 30-user 3068 "is capable of a performance that rivals large mini-computers." (Computerworld, April 1986). And it does it for a micro computer price – from $7,000 for OEM quantities.

BREAKTHROUGH MODULARITY

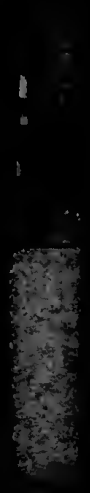
"Using plug-in boards the way a personal computer does really sets Altos apart." (research firm Creative Strategies, Computerworld, April 1986). OEM's can choose from a wide range of modules: 10 to 40 serial ports; 1 to 16 MB of memory; 17 to 200 MB (formatted) hard disk storage.

BREAKTHROUGH HARDWARE DESIGN

"Altos is way ahead of everybody else." (Creative Strategies, Computerworld, April 1986); high speed 8 KB cache maximizes CPU speed, with no wait states; cache is simultaneously shared between many processors; high performance memory management supports demand paged virtual memory; on-board microprocessors handle all I/O processing.

EXPANSION
BOARD SLOTS

IF A POWER LINE FALLS IN THE MIDDLE OF THE NIGHT AND NO ONE'S AROUND, IS THERE A CRASH?



TOWER XP.
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NCR

NEWS

MANAGERS ON THE MOVE

FRANK M. PILUSO has been promoted to senior vice-president of computing and communications at California Federal Savings and Loan

Piluso

Association at the institution's service center in Rosemead, Calif. Piluso will be responsible for California Federal's nationwide computer processing and data communications.

Piluso had previously been vice-president and division manager of computing and communications. He joined California Federal in 1983 from Carter Hawley Hale, Inc., where he had been director of information processing.

He is a 1971 graduate of California State University in Northridge, Calif.

■

JACK FUEHR has been appointed vice-president of MIS

Fuehr

for Lotus Development Corp. Fuehr will be responsible for worldwide data processing activities at Lotus and will provide added input for the marketing and development of Lotus products to end users in the MIS field.

Prior to joining Lotus, Fuehr managed the marketing and development of the Cashman Personal Finance Manager software at Verisoft in Dallas. Fuehr founded that company in 1984.

Earlier, he served as vice-president of data processing at Mostek Corp. in Carrollton, Texas.

He graduated from the Case Institute of Technology in 1964 with a B.S. in electrical engineering and from Carnegie Institute of Technology in 1966 with an M.S. in industrial administration.

■

JAMES A. DECKER has been named director of insurance systems and JOHN I. WOOLERY has been named director of Management Decision Systems for Security Pacific Information Systems, Inc.

Decker is responsible for new product development and applications support for insurance. He has more than 15 years of experience in the insurance data processing field.

He graduated from Indiana State University with a B.S. degree.

Woolery is responsible for financial systems and decision support product development. He has 13 years of experience in providing data processing services.

Woolery attended California's Los Angeles Valley College, where he studied general programming.

Security Pacific Information Systems provides data processing and telecommunications services to financial institutions including commercial banks, savings and loan institutions, insurance companies and mortgage banking companies. It also provides financial services and disaster recovery services to the financial industry and other industries. It is a subsidiary of Security Pacific Corp. of Los Angeles.

"Look Dad! I can graph our cash flow against the inflation rate and predict the date of our bankruptcy!"

Announcing Masterpiece:™ A Powerful Mainframe Application Software Product Built Upon A Simple Idea Called Intelligent Architecture:™

What do you call a mainframe application software product designed with such patient attention to detail that it will register the effects of one transaction on every other business transaction in a company?

What do you call software architecture so artfully conceived it will someday enable a person using an application to move from one database management system to another, or from one teleprocessing monitor to another, without a single change in his work style?

What do you call query and reporting tools so simply and powerfully rendered that even a novice will find them no more difficult to work with than a personal computer spreadsheet?

Only one name fits...

Introducing Masterpiece.

The Masterpiece series is a family of mainframe business software products—a classification and a category which may lead you to conclude that it is like other mainframe software products.

Don't leap to that conclusion.

The Masterpiece design is so clean and uncluttered that it makes current and future applications efficient to develop and easy to use. Masterpiece comes with none of the excess baggage, inherent short-comings or system limitations that have traditionally plagued the people who need business information and the people who manage it.

Masterpiece is, in every aspect, a new family of software products.

And, in every aspect, an *improvement* over the software packages you may be used to.

Or are, in fact, now using.

Intelligent Architecture Design: The Fundamental Difference.

Previous software designs have been developed to better utilize the power of the computer.

Masterpiece was designed to mirror the methods and styles of the work place and to anticipate the inadequacies of the computer.

Masterpiece design is called Intelligent Architecture. It's a new term. And a new way to build software. Now, Intelligent Architecture brings new meaning to concepts like "modularity," "borderless integration" and "event-oriented processing."

Only application-specific code is contained in the application ... other coding (system code, interfaces, code common to multiple applications) is separated out and coordinated by the Intelligent Architecture itself.

This means that ultimately a user can adopt a new database management system without the slightest change in either his way of working or in the application code itself.

Only software built in this manner, is software that will endure.

The Intelligent Architecture design means that all menus and screen prompts become common to all Masterpiece applications. It means that the way users interact with an application will be the same from application to application—a significant factor contributing to greater ease-of-learning and ease-of-use.

It is this capacity, present now in the Masterpiece Intelligent Architecture design, that lifts Masterpiece beyond the promise of other software products in its class.

And that is the fundamental difference.

Masterpiece is a trademark of Software International Corporation. Intelligent Architecture is a trademark of Software International Corporation. MasterQuery is a trademark of Software International Corporation. MasterSecurity is a trademark of Software International Corporation.

NEWS

CALENDAR

WEEK OF AUG. 11

AUGUST 12-13, CHICAGO — **Integrating Voice and Data in the Private Branch Exchange.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ariz. 60521.

AUGUST 12-13, TORONTO — **Principles of Prototyping.** Contact: Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held Aug. 19-20 in Portland, Ore., and Aug. 22-23 in Calgary, Alta.

AUGUST 12-13, TORONTO — **SAS Programming for New Computer Users.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511. Also being held Aug. 19-20 in Portland, Ore.; Aug. 22-23 in Calgary, Alta.; Sept. 9-10 in Atlanta; and Sept. 12-13 in Fort Worth, Texas.

AUGUST 12-14, LOS ANGELES — **Data Communications: Network Design Integration and Applications.** Contact: Software Institute of America, Inc., 6 Windsor St., Andover, Mass. 01810.

AUGUST 12-14, MILWAUKEE — **The IBM Personal Computer.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Aug. 14-16 in Baltimore and Seattle; Aug. 19-21 in Baton Rouge, La., and St. Louis; and Aug. 26-28 in Cherry Hill, N.J., and San Diego.

AUGUST 12-14, SEATTLE — **The IBM Personal Computer.** Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Aug. 21-23 in Chicago and Aug. 26-28 in New York.

AUGUST 12-14, SOMERSET, N.J. — **Data Communications Systems.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Aug. 21-23 in San Diego and Aug. 26-28 in Memphis.

AUGUST 12-15, CHICAGO — **IMS/DC (Data Communications) Programming.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 12-15, LOS ANGELES — **CICS/VS Logic and Debugging.** Contact: On-Line Software International, Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Aug. 19-22 in Atlanta and San Francisco.

AUGUST 12-15, SAN ANTONIO — **Vtam: From Start to Finish.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Aug. 19-22 in Fort Lee and Los Angeles.

AUGUST 12-16, CHICAGO — **Logical Data Base Design.** Contact: Cathy Chatfield-Taylor, Ken Orr & Associates, Inc., 1725 Gage Blvd., Topeka, Kan. 66604.

AUGUST 12-16, FORT LEE, N.J. — **CICS/VS Application Programming — Macro Level.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Aug. 26-30 in Los Angeles.

AUGUST 12-16, FORT LEE, N.J. — **CICS/VS Application Programming — Command Level.** Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held in Boston and San Francisco; Aug. 19, 21, 23, 26 and 28 in New York; Aug. 19-23 in Denver; and Aug. 26-30 in Atlanta.

AUGUST 12-23, PARSIPPANY, N.J. — **Ans Cobol.** Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

AUGUST 13-15, DALLAS — **SAS Processing Course.** Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

AUGUST 14-16, DENVER — **Office Automation.** Contact: Center for Advanced Professional Education, Suite 110, 1820 East Garry St., Santa Ana, Calif. 92705. Also being held Aug. 26-28 in Hartford, Conn.

AUGUST 14-16, SCOTTSDALE, ARIZ. — **PBX/CBX.** Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Aug. 26-28 in Long Island, N.Y.

AUGUST 15-16, SAN JOSE, CALIF. — **Network-**

See AUG, page 49

Masterpiece: Common Functions.

The reason Masterpiece works so well is because each of its pieces work so well together.

And apart.

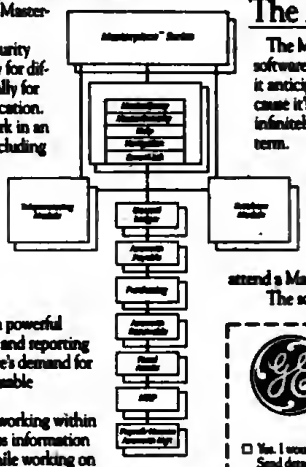
The MasterSecurity™ system, Online Help and Navigation features work across (and are common to) all Masterpiece applications.

But because they are separate from all applications, Online Help, for example, can be custom modified or even translated into different languages.

The Navigation feature lets you move from screen to screen with direct access from one Masterpiece application to another.

Levels within the MasterSecurity system can be determined not only for different applications but set specifically for transactions within the same application.

Everything is designed to work in an intelligent and modular fashion including what may now be the industry's most advanced query tool... MasterQuery.™



MasterQuery System.

The MasterQuery system is a powerful fourth generation borderless query and reporting tool designed to satisfy an executive's demand for instantly accessible and instantly usable information.

MasterQuery gives a person working within one application the ability to access information from another (accounts payable while working on general ledger, for instance) and to merge information from separate applications in a single report.

It also gives that person the ability to arrange his information in whatever form, format, or fashion he chooses. In whatever sequence or order. With whatever computations or projections he wants to make. With only the barest bit of computer know-how.

Masterpiece Integrated Applications.

The Masterpiece series will include these fully integrated, functionally rich business applications: General Ledger, Accounts Payable, Purchasing, Accounts Receivable, Fixed Asset Accounting, Human Resource Management and MRP software products.

Masterpiece: The Promise The Future Holds.

The Masterpiece series is truly "built from the ground up" software. Because its architecture is so well thought through it anticipates future enhancements and applications. Because it's a product designed to be completely modular and infinitely improvable it represents a real value over the long term.

It won't, in short, fall prey to technological or design shortcomings. Won't dead-end at some point. Won't fail to perform as your needs expand.

For a Masterpiece demonstration, clip the coupon below or call toll free 1-800-343-4133 (in Massachusetts, call 1-800-322-0491) and arrange to attend a Masterpiece executive briefing.

The sooner you call, the further ahead you'll be.

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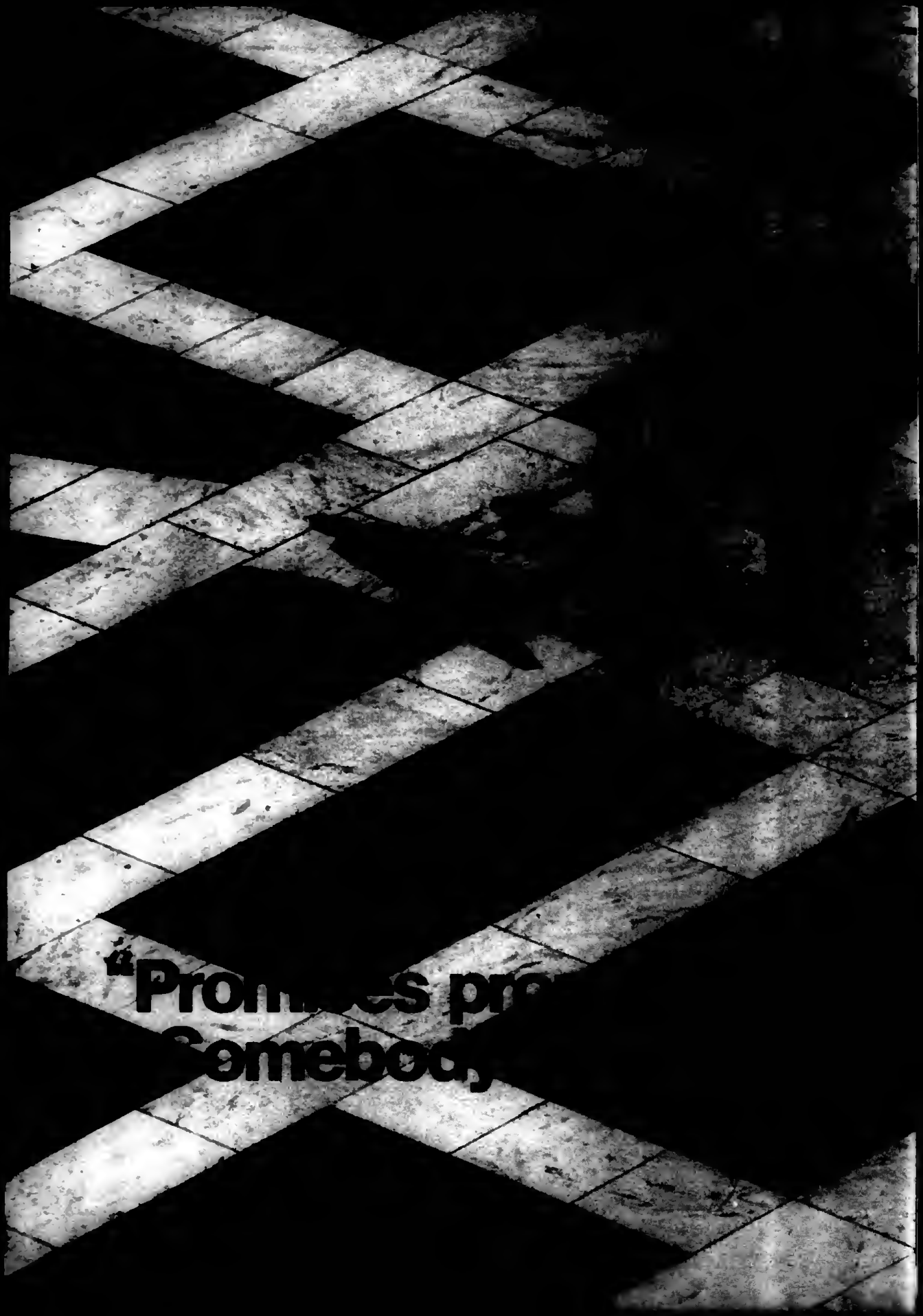

"Promises pr
Somebody

With more than 70 and enhancements, complete solutions

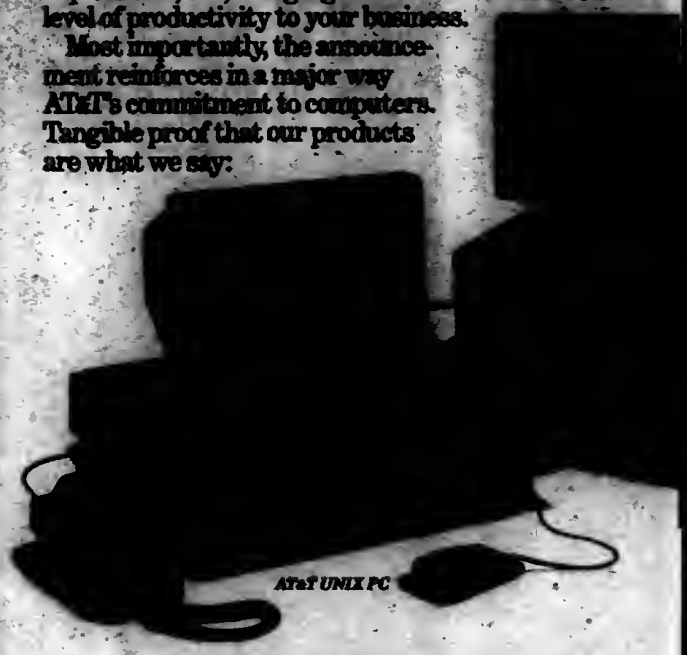
A few weeks ago, AT&T made a major computer announcement. Major in every way.

Certainly in the depth and breadth of the offering —which includes computers, peripherals, software, networking options, communications products and much more.

Major in terms of AT&T's growth as a force in the computer industry. Consider the new, enhanced and existing products. You'll find our line of integrated communications-based computers runs the gamut from PCs to superminis.

What's more, they can be connected easily to each other and to your mainframes. They're readily expandable, too, bringing a new level of productivity to your business.

Most importantly, the announcement reinforces in a major way AT&T's commitment to computers. Tangible proof that our products are what we say:



The Computers With The Future Built In. Our computer line now includes the following:

Computers: To serve an entire office, our recently enhanced line of AT&T 3B Computers puts the flexibility and power of the UNIX™ Operating System to work for you.

There are five models. Our new 3B2/400 can accommodate up to 46 different peripherals (terminals, printers, modems, etc.). The new 3B15 up to 128.

new computer products AT&T is now fully equipped to offer to your computer needs.

The 3B2/300 and 3B5 have both been enhanced with many features for better performance. The former can accommodate up to 18 different peripherals; the latter up to 128. The 3B20 has room for up to 256 peripherals.

The AT&T PC 6300 is for the single user in need of a superior MS-DOS* business computer. It can also run the Xenix* operating system.

For single or multi-user situations, the AT&T UNIX PC offers a unique combination of power, ease of use and advanced communications capabilities.

THE COMPUTERS WITH THE FUTURE BUILT IN

Communications: AT&T has always led the way in telecommunications. That leadership continues in computers. Our computers and communications products link together, allowing voice and data integration and shared information from PC to mainframe.

We now offer a complete line of low to high-end data communications products and service giving you complete control over the management of your data network.

Those with a major investment in mainframe computers can rest easy. Now you can enjoy complete end-to-end connectivity. We now support popular SNA and BSC protocols, which means our computers and systems can communicate and work with your mainframes. Your investment is protected.

Peripherals: We offer a full line of high-performance, highly reliable synchronous and asynchronous terminals and printers. They're highly compatible, too, with our own and other computers.

Software: Choose from a large and growing list of applications software based on UNIX System V. Some handle general business, such as word processing, financial spreadsheets, and business graphics. And some tackle specific needs of specific industries, including, accounting, automotive and retailing.

You'll also have the ways and means and tools to develop your own software.

The Future Looks Even Brighter

You'll find that all of these computer products are designed to work with your current system, while offering an almost unlimited variety and number of options for growth and change.

You know that when you buy an AT&T Computer product, you're making the right choice—and you're giving yourself more choice. Our flexibility gives you more options when the time comes to expand.

What's more, you'll find these high-quality products comparable, often superior, in price and performance. Which makes them an excellent investment.

AT&T also protects your investment by offering overall comprehensive service and support for computer hardware and associated software products.

This includes Customer Programming Services Centers, where we'll help you to develop your own software or customize existing packages. Implementation Services and Customer Training offer expert advice on the most efficient, productive use of your system.

Our National Software Support Center provides a 24-hour hotline for hardware and software support.

Our service options are another way we're working to help you pull the pieces together in a logical, coherent way.

In every way, we're working to make The Computers With The Future Built In work best for you.

For a more detailed look at what AT&T Computer products can do for you, just turn the page.

See how AT&T Computer products can make your system work as a system.

AT&T 4410 Terminal
AT&T 3B2/400 Computer

It's easy to get started putting AT&T to work for your business—in small easy steps or a complete system. These communications-based computer products are designed to work with each other, and with your existing system.

Start with the newly enhanced 3B2/300 or the new 3B2/400 to develop a distributed departmental system. Both are true 32-bit computers that run UNIX System V. The 3B2/400 offers full hardware floating point performance, streaming tape backup, and up to 4 MB of main memory. Supporting up to 10 or 25 users respectively, the 3B2/300 and 3B2/400 offer plenty of room for tape and disk storage growth.

For even higher storage capacity and performance, build your system around the enhanced 3B5 or the new 3B15 minicomputers.

The 3B15 is equipped with a high-performance WE™ 32100 microprocessor with main memory up to 16 MB. It supports up to 60 users on a number of configurations. Other features include demand paging memory management with file and record locking and standard floating point performance.

To over 500 tested software packages already listed in the AT&T Computer Software Guide, we're adding more applications programs, such as UltraCalc** and CrystalWriter.*** For systems developers, high level languages for 3B Computers such as UX-Basic† and Micro Focus Level II Cobol†† open the world to thousands of additional software applications running in the UNIX System V environment. And AT&T can address unique business needs with software solutions specifically for vertical markets such as accounting, real estate, and automotive industries. IBM††† mainframe VM users now have UNIX System V development capabilities through our System V-VM software.

It should come as no surprise that AT&T is the leading producer of advanced data communications equipment. To our already large and growing list we've added DATAPHONE* I, a complete line of synchronous, private line, analog, non-diagnostic modems with speeds from 2400 BPS to 14.4 KBPS. Also available is DATAPHONE I Plus Service Management, which provides you with private line network management through AT&T, eliminating the need for an in-house staff.

Dataphone I Modems

DATAPHONE II is a family of digital and analog modems, multiplexers, and diagnostic control devices for multilevel network management and control. To the family we just added the DATAPHONE II Model 2600 Digital Data Service Unit, an integrated DSU and Channel Service Unit in one compact, easy-to-install and operate unit. Plus, it is fully compatible with the DATAPHONE II equipment you're using now.

AT&T 4410 Terminal
AT&T Model 4000 MODEM

Our 3B Computers work with your IBM mainframes through connectivity products that allow full interactive communication using BSC and SNA/SDLC protocols. The new host connectivity products include the SNA/3270 Emulator + software which emulates a fully configured SNA IBM 3274 controller, and the BSC/3270 Emulator + which emulates the BSC IBM 3274 Cluster Controller. And C language programmers can use a library of AT&T Application Program Interface access routines to communicate directly with a host computer in a 3270 mode.

Of course, one advertisement can't begin to do justice to the full line of AT&T Computer products. There's much more to talk about.

For more details, contact your AT&T Information Systems Account Executive, authorized AT&T Representative, or call 1 800 247-1212.

Do it today—and start building a completely integrated business communications system. With the one company that can pull it all together.

AT&T 3B5 Computer
AT&T 4410 and 4425 Terminals

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†††IBM is a registered trademark of International Business Machines Corp.

AT&T
The right choice.

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AUG. from page 43

ing the IBM Personal Computer. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

AUGUST 15-16, TORONTO — The Information Center. Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015. Also being held Aug. 22-23 in Philadelphia.

WEEK OF AUG. 18

AUGUST 18-23, DALLAS — Systems Development: Information Modeling. Contact: Arthur Young & Co., Arthur Young Education Center, 1950 Roland Clarke Place, Reston, Va. 22091.

AUGUST 18-23, LOS ANGELES — The International Joint Conference on Artificial Intelligence. Contact: Claudia Mazzetti, American Association for Artificial Intelligence, 445 Burgess Drive, Menlo Park, Calif. 94025.

AUGUST 19-20, BOSTON — Data Communications II: Digital Communications Systems. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

AUGUST 19-20, DETROIT — Information Centers: End User Computing. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held September 26-27 in Atlanta.

AUGUST 19-20, HASBROUCK HEIGHTS, N.J. — Unix/Xenix. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Aug. 21-22 in Hartford, Conn.; Aug. 26-27 in St. Louis; and Aug. 28-29 in Philadelphia.

AUGUST 19-21, NEW YORK — SAS Computer Performance Evaluation Course. Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

AUGUST 19-21, NEW YORK — Telecommunications Management. Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

AUGUST 19-22, SAN ANTONIO — Vsam: Its Structure and How to Use It. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Aug. 26-29 in Fort Lee and Los Angeles.

AUGUST 19-22, SAN FRANCISCO — Data Base Development Workshop. Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

AUGUST 19-23, PHILADELPHIA — Advanced Systems Analysis. Contact: Thomas J. Bisacquino, Director of Education, Association for Systems Management, 24587 Bagley Road, Cleveland, Ohio 44138. Also being held Sept. 23-27 in Hartford, Conn.

AUGUST 20, NEW YORK — CICS/VS Application Design. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024. Also being held Aug. 22, 27 and 29 in New York; and Aug. 26-29 in Denver.

AUGUST 20-22, NEW YORK — SAS Processing Course. Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

AUGUST 21-23, ARLINGTON, VA. — Local Area Networks. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705. Also being held Aug. 26-28 in Montreal.

AUGUST 21-23, BOSTON — Data Base Administration and Data Resource Development. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held Sept. 11-13 in Dallas.

AUGUST 21-23, CARY, N.C. — SAS Operations Research Course. Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

AUGUST 22-23, NEW YORK — SAS Report Writing Course. Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

WEEK OF AUG. 25

AUGUST 25-30, DALLAS — Systems Development: Design Phase. Contact: Arthur Young & Co., Arthur Young Education Center, 1950 Roland Clarke Place, Reston, Va. 22091.

AUGUST 26-27, SAN ANTONIO — CICS/VS Performance and Tuning. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 26-28, PARSIPPANY, N.J. — Vsam in Cobol. Contact: Chubb Institute, P.O. Box 342, 8 Sylvan Way, Parsippany, N.J. 07054.

AUGUST 26-29, FORT LEE, N.J. — IMS/DB (DL/1) Application Programming. Contact: On-Line Software International, Two Executive Drive, Fort Lee, N.J. 07024.

AUGUST 26-29, SAN FRANCISCO — Integrated Information Technology Conference and Exposition (Intech '85). Contact: Jill Nieman, National Trade Productions, Inc., 2111 Eisenhower Ave., Alexandria, Va. 22134.

AUGUST 26-30, HOUSTON — Analysts' Skills Workshop. Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

AUGUST 27-29, HOUSTON — SAS Basics Course. Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

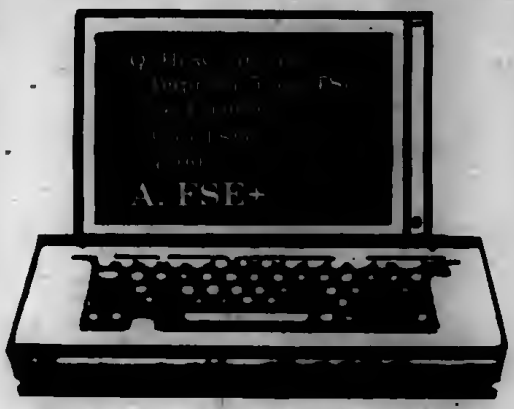
AUGUST 27-29, CARY, N.C. — SAS Applied Time Series Analysis and Forecasting. Contact: SAS Institute, Inc., Box 8000, SAS Circle, Cary, N.C. 27511.

AUGUST 28-29, SAN ANTONIO — Recovery/Restart. Contact: On-Line Software International, Inc., Fort Lee Executive Park, Two Executive Drive, Fort Lee, N.J. 07024.

WEEK OF SEPT. 1

Sept. 4-6, LOS ANGELES — Information Systems Architecture. Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

TSO users
4300 MVS users



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Quality Software Since 1973

EDITORIAL

Sitting out the show

Digital Equipment Corp.
Wang Laboratories, Inc.
Apple Computer, Inc.
Tandem Computers, Inc.
Compaq Computer Corp.
McCormack & Dodge Corp.
Management Science America, Inc.
Software International Corp.
Lotus Development Corp.

The list of vendors that will not attend the 1985 National Computer Conference this week is almost as interesting as the list of those that will attend. What interests us more than the question of who is sitting out the show is the matter of why they are sitting out.

There will, of course, be plenty to see and do at NCC. The American Federation of Information Processing Societies, Inc., the show's sponsor, said more than 600 exhibitors from 320 product and service categories will blanket the McCormick Place convention center. NCC Program Director Anthony S. Wojcik has assembled an impressive roster of 84 technical and 27 professional development sessions. And Afips estimates that the show will draw 80,000 attendees.

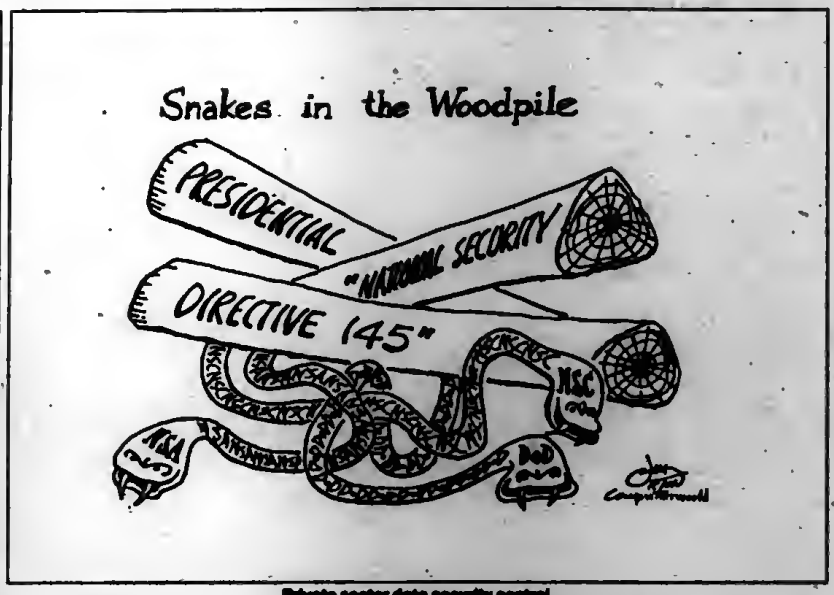
There is, however, a rising chorus of vendors, such as those listed above, that find NCC no longer delivers enough bang for the buck. Some, like McCormack & Dodge and Computer Associates International, Inc., prefer more focused trade shows where they can accomplish serious educational selling to decision makers. Others, like Wang and Apple, have had to cancel because of financial difficulties.

Approximately 50 vendors from last year's show will not be in Chicago this year. And the 600 exhibitors who will be on the floor are fewer than the 694 who exhibited at NCC '82 in Houston. Afips has also reduced its attendance estimates from 100,000 in 1982 to 80,000 this year.

But attendance and exhibitor figures at this or any other trade show merely hint at some deeper forces affecting computer vendors and computer users at the midpoint of this decade. Among them are the following:

- NCC is one of hundreds of shows in this business. With so many trade shows confronting them, vendors are resorting to more cost-effective marketing strategies.
- There is a glut of products on the market — thousands of them with new ones released every day.
- Big corporations have been computerized, and the easy bucks have been made. Vertical markets and small businesses are the new frontiers.
- Stiff foreign competition and the strength of the dollar overseas hamper the domestic computer industry and will continue to do so in the near future.
- Deregulation of AT&T has confused and users, nurtured the communications bypass industry and spawned new telecommunications alliances such as IBM-MCI.
- Financial fissures are showing up for the first time in stalwarts like IBM, DG and Wang. These, like the industry itself, were thought to be recession proof. The very technological leadership of the U.S. computer industry has been called into question.

Given the state of the industry right now, these companies sitting out NCC this year are doing so for good reasons. They have more important business to attend to.



Private sector data security control

LETTERS

Paying for specialized knowledge

I am writing to you in reference to the letter from a micro and OA consultant in Larry Long's column Turnaround Time [CW, June 10].

I, too, am a consultant. The most important thing a consultant must know is the state of the organization. We learned long ago that people cannot write computer programs to solve a problem unless they understand the problem. Certainly this consultant in the column was doing what most consultants would do — learning about the state of the organization and about the people involved.

Some of us will turn down consulting engagements when we learn of the state of the organization and its people. Perhaps I should phrase it that we will turn down engagements when we learn the *true* state of the organization; not what the person hiring us thinks it is.

It seems to me that the bill for consulting services might be correct for a month's work. The consultant could have worked 100 hours at $60 per hour, and that would be $6,000.

Many people don't realize that expertise is not cheap. But many times the person who calls in a consultant is cheap. I have many instances where people are simply shocked at what the job will cost.

Consultants are hired for their specialized knowledge. They must mesh their knowledge with the situation of the organization they are helping.

The best way for people to judge consultants is to talk with prior clients.

Ruth Hudson Lankford
Indianapolis

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VIEWPOINT

Early announcements: Let the buyer beware

THE DATA CENTER
John P. Murray

Last year, *Computerworld* paid considerable attention to the early announcement of products and features and the impact of those announcements on customers [CW, July 9, 1984]. The article raised the ethical aspects of this issue. There are, however, pragmatic issues involved here that should be considered.

Anyone who is responsible for an organization's funds — particularly those the magnitude of information processing purchases — and is not cautious and prudent when dealing with the vendor is simply remiss.

If an organization does find itself in a situation where the vendor fails to deliver what was promised but was never demonstrated, it produces difficulty. Then it would appear that those responsible for dealing with the vendor are the ones to blame.

How do such circumstances come about? Usually they result from the customer's desire to realize the benefits of the proposed enhancements. If that desire is strong, it can often induce the customer into a false sense of security. We often hear what we want to hear. We want to believe that the enhancements will be delivered, as promised, on time.

Murray is director of management and information services for American Breeders Service, a DeForest, Wis., division of W. R. Grace & Co. and is the author of Management Information Systems as a Corporate Resource.

Unfortunately, it is often the case that the failure to deliver whatever may have been promised has repercussions that range far beyond the information processing department. It may affect the plans of other departments or perhaps those of the entire organization.

Given that these enhancements represent considerable value to the organization, and that nondelivery can pose serious problems, how can customers protect themselves from such difficulties?

The most secure method is to see the new feature in actual use in a client's environment and to talk to that client about the performance of the feature. "If I can't see it, I don't believe it," will work over time to the benefit of the customer.

If the vendor cannot provide a working example of the enhancement, the safest and most sensible approach is simply to delay any consideration of the new product, at least until reasonable test results can be verified. Although that is the most prudent approach, it is often the case that pressure — often political pressure — will be exerted to accept the enhancement as though it were a fact rather than a concept.

Steps for protection

If that is indeed the case, there are still steps that information processing managers can take to provide at least some degree of protection for the organization.

The first step should be to provide many qualifiers and caveats to any proposal for information processing clients and the organization's senior management in their evaluation of the particular enhancement and its impact on the organization. Statements such as, "untested technology," "high degree of risk," "potential for failure" might be considered good attention-getting devices.

Another step is to write as much protection as possible for the organization into the agreement between the organization and the vendor. The delivery date specification and the performance of both the product and the vendor should be clearly determined and identified. Nothing significant should be left out of this document.

Relying on statements from sales representatives such as, "not to worry, that can all be worked out later, trust us," may indeed turn out to be something to worry about at a later date. In all cases, make certain your legal people are involved. Trust their judgment, and follow their advice.

There are numerous organizations that have suffered embarrassment or serious operational and financial distress even to the extent of going out of business because of imprudent anticipation of new features that were never fruitful or were so late when finally delivered, that they were of little value.

Selling solutions to problems

Competition is not likely to become any less fierce among those who want to sell solutions to our myriad problems. The nature of change is so strong and so rapid in our business, that expecting all vendors to wait to announce some dramatic new feature until it is fully tested and ready for the market appears to be unrealistic.

Those who deal with the issues involved in early announcements should understand sufficiently their inherent complexities and realize that a prudent approach is not only the best one but also the only one.

The admonition "let the buyer beware" is still valid and should be used when dealing with early announcements. If you don't heed that advice, you have no one to blame but yourself.

Clever Hans and the data processing tool kit

MANAGEMENT MATRIX
Walter F. Cuirle

Back around the turn of the century there lived a computational phenomenon: a horse known as Clever Hans. He became quite a worldwide sensation in that Hans' trainer claimed to have taught the horse to solve arithmetic problems; what's more, the trainer could, and did, publicly demonstrate the horse's ability with numbers.

This wasn't a circus act. The trainer, a research psychologist, entirely attributed Hans' abilities to a new training method he had developed. This was a conceit that he was certainly entitled to if, in fact, the method worked. And, after all, it must be true because Hans did come up with the right answers.

Not always. A panel of psychologists looked into this data processing sensation and found that Hans got the right answer only when his trainer was visible and only when the trainer also knew the right answer. It wasn't a scam — the man honestly believed he had trained the horse to do arithmetic problems. But herein lies a message for the data processing manager of today.

Turn the clock forward 70 or 80 years, and change the setting to your own programming staff. Somewhere out on that workhorse they work with is undoubtedly a set of files known collectively as "the tool kit."

In it are dozens of subroutines and program stubs: a little something to set up a standard report format, another to import selected data from a master file, some routines that do common financial calculations, all of them frequently patched wholesale into new systems.

The tool kit files have two things in common: most were written by individual members of the staff for the specific needs of the company, and most were probably not documented by these individuals.

Typically, the tool kit is used in a specific fashion. For example, a junior programmer is assigned to modify a financial package and comes across a call to something named YLDCALC. The comment line, if there is any, says something like "Pass rate in R, yield returned in Y."

If not pressed for time, your junior staff member may ask someone about it. The answer may be, "It's OK. It's in the tool kit."

Generally, though, the programmer is too hurried to ask, and if the modification doesn't involve part of the code, then why bother with it? After all, it's in the tool kit so it must work, and if it works, don't fix it.

> *It's well worth your while to audit that tool kit. Find out what's in it, find out how each routine works, and document it. This is especially true if the creator of the code has long since left the company.*

Right?

Wrong. If it works, but your programmer doesn't know why, using the code is exactly like using Clever Hans to do calculations. The person using it assumes that clean input will yield correct output. But the person who created the code may well have done so for a completely different application under a whole array of assumptions that may or may not fit the current job.

It's the kind of thing that can go on for quite some time before anyone catches it. It's the kind of thing that makes accountants prematurely bald and wizened.

Well worth your while

It's well worth your while to audit that tool kit. Find out what's in it, find out how each routine works, and document it. This is especially true if the creator of the code has long since left the company. Remember that Hans only gave the right answer when his trainer was present; we've all probably seen code with the same problem.

Have the code analyzed, or throw it out. Establish controls and set up an authorized tool kit — routines used from the authorized list of documented tools are the only ones for which the department takes responsibility. Set up a review mechanism to get a routine authorized. Hand out some kind of reward to people who create new tools that make the authorized list.

These routines are specific to your company's needs and are essential to its operation because they are used so widely. It is critical that the programming staff know how they work before they use them.

The moral of the story of Clever Hans is that clean output isn't everything. There's an interesting twist to it for you etymology fans: the trainer of Hans the horse was German, and the word "clever" is an English translation of the German "kluge." Seems like the more things change, the more they stay the same.

Cuirle is a senior associate with Nicholas DeMaio Associates in Bryn Mawr, Pa.

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SOFTWARE & SERVICES

NBS guide illustrates logical data base design

By Mitch Betts
CW Washington Bureau

GAITHERSBURG, Md. — A poorly designed data base structure can result in costly, time-consuming software revisions — frequently with poor results — as user needs change. On the other hand, a well-designed data base structure can ensure the modularity, efficiency, consistency and integrity of the data base.

To help data administrators and data base administrators achieve the latter, researchers at the National Bureau of Standards (NBS) have recently developed a guide for logical data base design.

Researchers at the agency's Center for Programming Science and Technology created a four-step methodology for logical data base design that applies to very large, complex information systems. "By providing a detailed and unambiguous description of the system's information requirements in relation to the end users' perspectives, [logical data base design] offers a bridge between the end users and the physical data base designers and applications programmers," the NBS guide stated.

"The methodology emphasizes both the need for speed, so that the design will be completed in time to be useful, and the need for quality control, to ensure that the design is consistent, complete and satisfies the eventual users," it added.

The NBS defined logical data base design as the process of determining the fundamental data structures needed to support an organization's information requirements.

The structure determines the way the data is collected, stored and protected from unauthorized access.

"If done correctly, logical data base design for a complex information system is a massive undertaking. The short-term cost of [logical data base design] is great, but the long-term benefits of better information and greater flexibility provide substantial savings over the system's life cycle," the NBS concluded.

A high-quality logical data base design, the researchers said, will be internally consistent to reduce the chances of contradictory results from the information system; complete, so that information queries can be satisfied; and robust enough so that the data base structure can be adapted in response to changes in information requirements.

To fulfill these goals, a good data base design should be independent of any particular application so that all applications can be satisfied, and independent of any particular hardware or software, so that

See NBS page 68

'Up to now, the key computer professional was someone who could learn enough about the needs of organizations to express them in computer language. In the future, as our society becomes irrevocably computerized, the key professional [will be] someone who can learn enough about computerized systems to express them in human language. Without that someone, we [will] have lost control of our society. That someone is the reverse engineer. Software maintainers are the reverse engineers of computing.'

— Meheian Zvegintov, publisher
Software Maintenance News

SOFTLINE/DONALD ROTHSCHILD

Planning key in conversion

An unprecedented increase in acquisition and merger activity has prompted the consolidation of corporate DP operations and software applications. While such consolidation may decrease costs and provide greater operating control, achieving those results requires a structured approach to systems conversions.

The systems conversion process should begin with a formal conversion definition. The conversion team's charter should specify the scope of the conversion as well as the time allotted for it. The charter should also establish the authority to be vested in the conversion team manager and other team members. Personnel who are not used to working in a conversion project are likely to be involved, and it is essential that the team exercise full authority over all aspects of the conversion.

The team should be assembled as soon as the scope of the conversion has been determined. It should be headed by a project manager who will be responsible for all aspects of the conversion, including the management and support of team members. The project manager's qualifications should include industry-specific and data processing expertise as well as experience in the design, implementation and validation of applications.

In addition, the team needs one or more systems analysts, depending on the scope of the conversion project, to direct efforts for individual applications. Like the project manager, the systems analysts require both industry-specific and DP expertise. Programmers should be expert in the required language, although they need not have a strong industry-specific background.

User representatives should also be included in the team, to determine whether the functional system design meets their requirements and to pro-

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■ Burroughs offered an enhanced release of its Linc applications development tool/68

■ A turnkey Ada software development system was introduced by Rational/68

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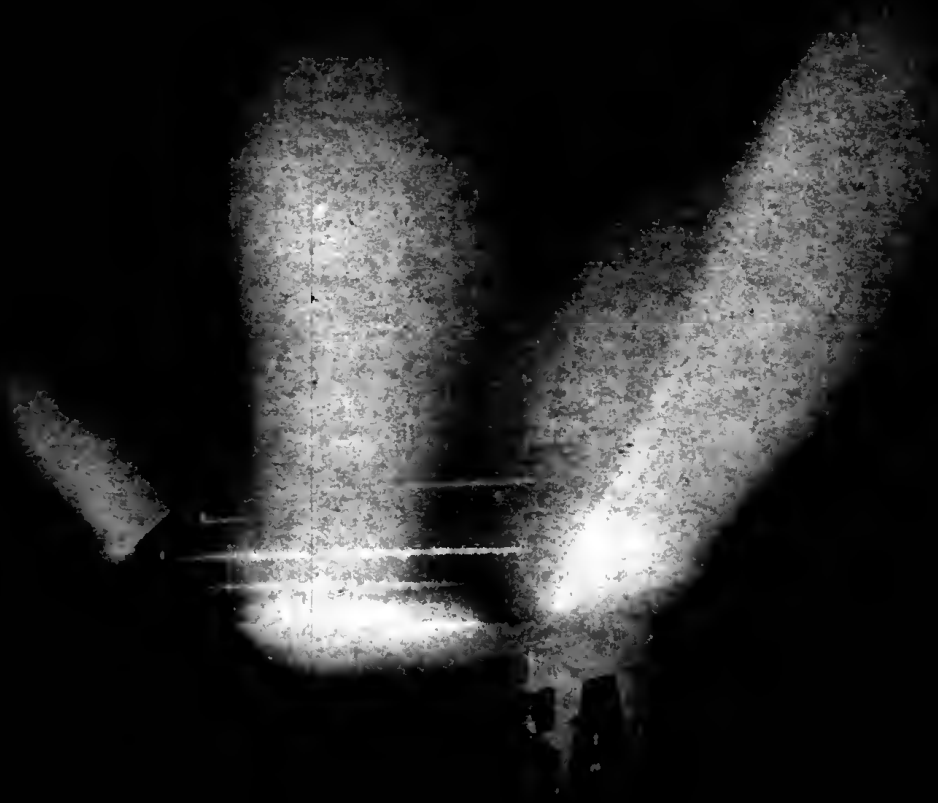

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Rational unveils development system for Ada projects

R1000 said to improve creation, maintenance

MOUNTAIN VIEW, Calif. — Rational has introduced the R1000 Development System, a combined hardware and software system that supports Ada language software development projects.

According to a spokesman, the R1000 Development System was designed to improve the production and maintenance of large Ada applications, including systems for computer-aided engineering, banking, industrial process control and defense and aerospace. The R1000 consists of the R1000 processor and the Rational Environment, which supports the design, implementation, test, integration and maintenance of Ada software.

The R1000 processor is said to provide the processing, storage and communications facilities required for Ada development projects. It is based on a proprietary architecture developed to support the Rational Environment and interactive, multiple-programmer software development. The processor provides up to 1.9G bytes of unformatted disk capacity and includes a streaming tape drive supporting densities of 1,600 or 6,250 bit/in. It also supports up to 64 asynchronous communications lines.

Rational also offers the Rational Terminal and Printer. The Rational Terminal was designed for Ada software development and provides a full-page, 66-line by 80-char. display and custom keyboard.

The Rational Environment is said to provide interactive support capabilities and replaces the operating system and tools of a general-purpose computer. It incrementally checks a programmer's code for syntactic and semantic errors and correction. It also completes the syntactic structure of program fragments. Users interact with the Rational Environment through the Rational Editor, a multiple-window, full screen editor through which users can enter data and commands, edit objects and receive program output.

The Rational Environment also includes an Ada compilation system validated by the U.S. Department of Defense. The system features an incremental compilation capability that allows developers to make changes without recompiling a module.

The Rational Environment offers a source-level debugger, configuration control facilities and project management and control capabilities.

Pricing for the R1000 Development System begins at $595,000, the vendor said.

Rational is located at 1501 Salado Drive, Mountain View, Calif. 94043.

Advertisement

informatics general corporation

application development report: MARK V

HARRISBURG MARATHON PROVIDES TRIAL RUN FOR MARK IV® AND MARK V® SOFTWARE

Within two hours after the last runner had crossed the finish line at the Harrisburg Marathon, Pennsylvania Blue Shield, chief sponsor of the annual event, had completed a computer-generated report on the run times and standings of the Marathon's 900 entrants and delivered it to the news media.

This was in sharp contrast to the previous year when it took approximately three days to get the Marathon results to the media. The greater responsiveness this year was largely the result of moving the Marathon application from an in-house Prime computer to Blue Shield's IBM 3081 system running in an IMS environment. The reprogramming of the Harrisburg Marathon application, completed in record time, was Blue Shield's initial test project for MARK V and MARK IV, Application Development Systems from Informatics General Corporation for generating online and batch applications respectively.

"We wanted to get acquainted with MARK V on a relatively simple and straightforward application like the Marathon before we began our full-scale pilot project, a new online claims processing system," Thomas M. Cline, Systems Development Supervisor, explained.

Programming the Marathon application consisted basically of creating and maintaining an online Entrant File including four screens to (1) maintain basic entrant information (name, address, phone number, and a "TAC" number to be used for Olympic identification in case the runner qualifies for the U.S. Olympics); (2) maintain control information (payment of fees, lunch and dinner reservations, etc.); (3) record the run time of each of the approximately 900 entrants; and (4) provide a menu for accessing the other three screens.

To produce reports in addition to the online portion of the Harrisburg Marathon application, Blue Shield used another Informatics Implementation System, MARK IV, to produce the required batch reports. A productivity tool designed for generation of batch applications, MARK IV also had its "trial run" for Blue Shield with the Marathon application.

Approximately 12 different reports were produced for the Marathon, including check-in sheets for use on the day of the race (cross-referencing the runners alphabetically and by runner number), three sets of mailing labels, and several types of reports listing the finishers by time, sex, and class of the runner. The reports on finishers were prepared for the news media, for internal use, and for the Athletic Congress listing any runners who qualified for the U.S. Olympics.

1985 was the eleventh year that the Harrisburg Marathon has been run. Unlike the famous Boston Marathon, which requires that entrants meet qualification standards, anyone can enter the Harrisburg event. The grueling course — 26 miles and 385 yards in length — begins near the Pennsylvania State Capitol building and winds through the streets of Harrisburg and the surrounding countryside.

Each year, large numbers of Pennsylvania Blue Shield employees volunteer their time to help with the race. "Probably 30 percent of our DP staff were involved in some kind of volunteer work for the Marathon," said Hugh Gallagher, also a Systems Development Supervisor, who coordinated the record-keeping for the Marathon. "This included registering entrants, manning water stations, keeping track of times, all sorts of things. For example, our Director of Systems Development, Karl Mundia, was in charge of one of the water stations, and I was in charge of the finish line."

Everything about the Marathon was done on a volunteer basis — including the programming for the new online Entrant File application, which was done primarily in evenings, lunch hours, and weekends, with Tom Cline doing most of the programming himself in MARK V and MARK IV.

"Our time for preparing this was so short that some of the software had never been tested prior to the day of the race," Gallagher recalled. "Fortunately, it worked like a charm."

"One of the things I found in implementing the Harrisburg Marathon application was that you don't need a lot of in-depth knowledge of IMS to use MARK V in a straightforward application like this, where you're just going in against a data base to update and add segments," Cline noted.

"I found that MARK IV and MARK V complemented each other very well," Cline added. "I found that with MARK IV, once I had established a set of reports, it was very easy to go back in and change a report, or set one up with a different set of selection criteria. I found I could make a change to a report in minutes. If I'd been working with COBOL, as I have in the past, this would not have been a matter of minutes."

"So far, we've only just gotten our feet wet with MARK IV and MARK V," Cline concluded. "But it looks quite promising in terms of potential productivity increases. I'm particularly impressed by the flexibility I've seen in setting up our initial application — the ability to make changes in a very short period of time."

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MARK IV AND MARK V ARE REGISTERED TRADEMARKS OF INFORMATICS GENERAL CORPORATION. 1984

Burroughs provides Linc enhancements

DETROIT — Burroughs Corp. has announced the Logic and Information Network Controller II (Linc II), a successor to its Linc fourth-generation applications generator. The package runs on Burroughs mainframes, from the B1000 to the A 15.

Linc II enhancements include interactive systems development and screen and report painting capabilities, a data dictionary, synchronized recovery and real-time communications between multiple applications systems, a spokesman said.

With Linc II, users can generate design prototypes, screen and report formats, transaction processing logic and special report and inquiry functions.

Linc II provides multiple language support, in both the interactive system development process and in Linc II-generated applications. Linc II is integrated with Burroughs systems software and operates without conversion on Burroughs mainframes, the vendor said.

Linc II prices begin at $26,000. Shipments are scheduled to begin in the fourth quarter.

Burroughs is located at Burroughs Place, Detroit, Mich. 48232.

SYSTEMS SOFTWARE

■ Tone Software Corp. has announced TS-Dears, a data-entry and retrieval system intended to enhance the usability of IBM's CICS in DOS/VSE, VS1, MVS and MVS/XA environments. TS-Dears runs as a CICS transaction.

TS-Dears enables an installation to develop on-line interactive applications for data entry and retrieval without requiring any knowledge of CICS programming. The applications are developed with the aid of the TS-Dears screen-painting facility. Data can be stored in and retrieved from any Vsam data set.

TS-Dears incorporates a data-validation language said to ensure the integrity of data as it is entered. Data-entry features include automatic

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SOFTWARE & SERVICES

Continued from page 59

batch number assignment and a batch directory status display.

TS-Dears costs $15,000. Leases are available.

Tone Software, 1735 S. Brookhurst St., Anaheim, Calif. 92804.

■ **Dias Corp. has released an enhanced version of its PCLink/1000, which provides file transfer capabilities from a number of microcomputers to Hewlett-Packard Co. HP 1000 minicomputers.**

PCLink/1000 1.1 resides on an HP mini and runs under HP's RTE-VI/VM and RTE-A operating systems. Binary and text files can be transferred with the product. The package supports transmission rates up to 19.2K bit/sec.

PCLink/1000 costs $1,995 for a single CPU license or $4,995 for a site license.

Dias, 363 Cretin Ave. S., St. Paul, Minn. 55105.

■ **Touch Technologies, Inc. has announced a high-performance sort package for Digital Equipment Corp. VAX processors under VMS Versions 4 and 4.1.**

TTI Sort includes a transparent interface between user applications and the VAX-11 Sort. The package supports calls through DCL from both immediate mode commands and command files.

No command changes are necessary, so existing command files in DCL can be used without modification, according to vendor.

TTI Sort costs $1,295 for the first processor and $300 for each additional processor.

Touch Technologies, Suite 101, 609 S. Escondido Blvd., Escondido, Calif. 92025.

■ **Western Computer Services, Inc. has announced Release 2.2 of Resource Executive (RX), an adjunct to IBM's RSX operating system that controls traffic flow and systems security for IBM's Series/1 minicomputer.**

RX substitutes menu options for extended EDX command strings, allowing end users to use the system easily, a spokesman said. With RX, security ratings reportedly can be assigned to each menu option and to each user.

RX tracks and records system use and queues all batch jobs so that high-priority jobs are run first, according to the vendor.

RX searches for additional memory if insufficient memory is available for a job, and it broadcasts messages to any combination of terminals, a spokesman said.

To install RX, a user needs a minimum of 28K bytes of free memory, 2,500 records of free, contiguous disk space, EDX Version 3 or later, at least one installed IBM 4978, 4979 or 3101 block mode terminal, a diskette drive and IBM's Sort/Merge command or the equivalent.

RX costs $1,995 in single quantities.

Western Computer Services, Livery Sq., 33 Neill Ave., Helena, Mont. 59601.

■ **Softouch Systems, Inc. has introduced a windowing facility for terminal users accessing IBM mainframes running OS under CICS.**

CICS-Windows allows terminal users to access up to four windows and conduct concurrent sessions. CICS transactions can be initiated from and respond to any of the open windows while the concurrent sessions are active.

Single-keystroke operation, full panning functions and instant switching capabilities between full screen and window mode are included. Data can be transferred between applications in open windows, the vendor said.

CICS-Windows costs $7,500 for IBM DOS and $10,000 for OS operating systems.

Softouch Systems, 8265 S. Walker St., Oklahoma City, Okla. 73139.

PRODUCTIVITY AIDS

■ **PAE, Inc. has announced a series of productivity aids for IBM's System/38.**

Tuner/38 is a storage management system that works to allocate storage between System/38 subsystems. The product allows users to put a maximum and minimum storage capacity level on an S/38 subsystem. It costs $1,100.

Timer/38 is a job scheduling system that automatically powers down a system after all-night processing and brings the subsystems up in the morning.

The product can be used to control batch and maintenance processing. It costs $500.

Librarian/38 is a tape and diskette management system that includes a Spool Management System. The product gives users the ability to save output on tape or diskette by selecting a menu option. It costs $500.

The Qinbetween utility allows users to take print jobs out of either the System/38 Qbatch or Qinter files to improve job queue performance time. It costs $500.

Paagraph is a graphics display system for analyzing job responses. It costs $300.

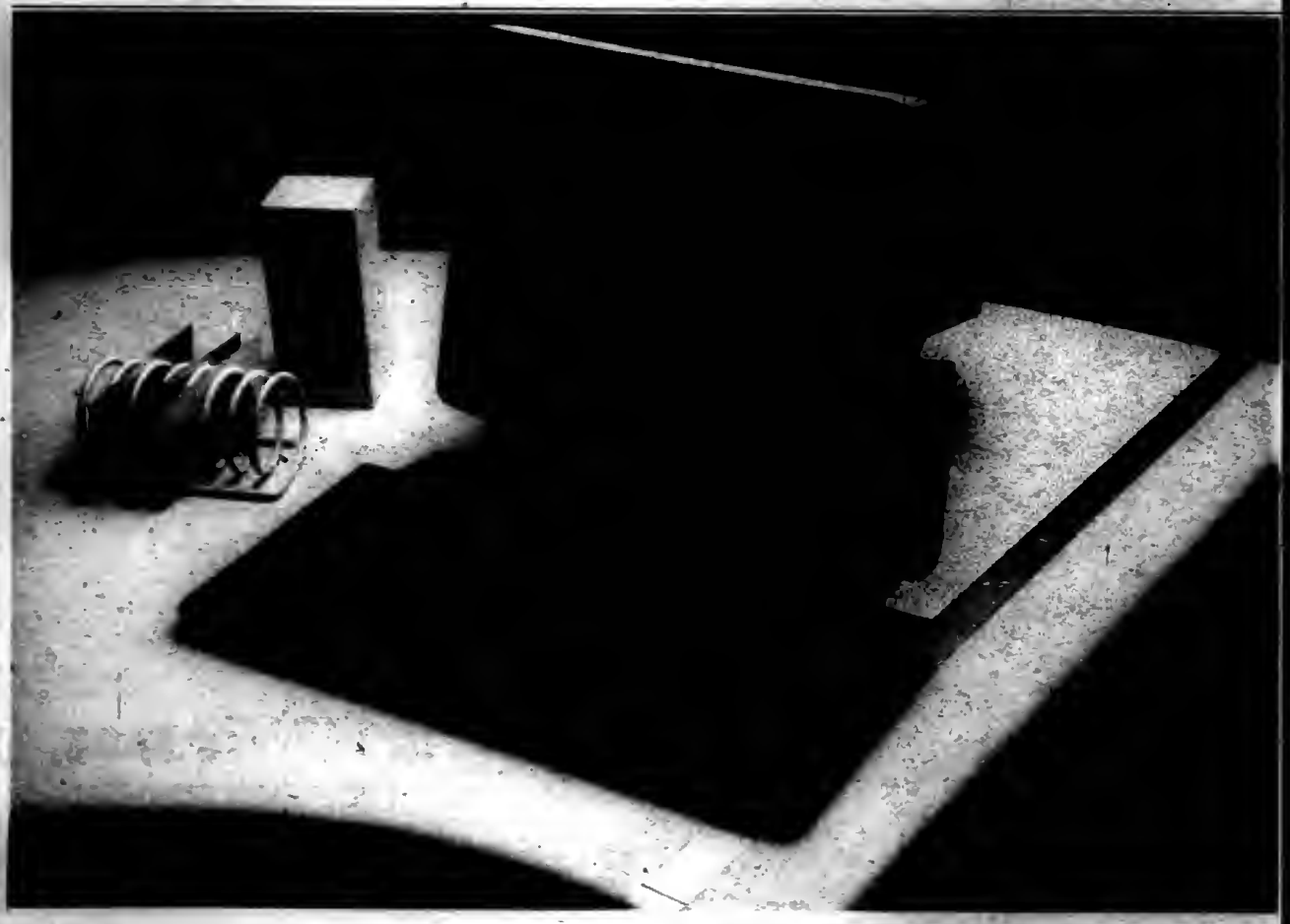
PAE, 7 Riverway Road, Salem, Mass. 01970.

■ **Panaphic Systems, Inc. has announced that Gener/OI, its on-line program development system for IBM's CICS, now supports IBM's 3179 Model G graphics terminal.**

Gener/OI supports the use of the mouse pointer, graphics cursor and host-addressable plotter available with the 3179G, according to a spokesman.

Gener/OI uses Release 4 of IBM's Graphic Data Display Manager software as a device driver to the IBM hardware.

Applications developed under Gener/OI, including graphics and nongraphics applications, will run on the 3179G without modification. Ap-



SOFTWARE & SERVICES

plications developed using the 3179G can be run on other properly equipped IBM devices.

Gener/OI costs $35,000 for DOS and $40,000 for OS.

Panaphic Systems, 709 Enterprise Drive, Oak Brook, Ill. 60521.

■ MB & Associates has announced utilities for cross-referencing JCL and accessing partition data sets (PDS) in IBM OS environments.

VXREF is a cross-reference utility that produces reports on file, program and job relationships. A job report indicates procedures, programs and files used in selected jobs. A data set report identifies jobs, procedures and programs that use each of the files in the job run.

VSRCH allows users to search and print partition data sets. The product allows users to find and modify JCL statements affected by a change, print or copy selected members in a partition data set, generate new PDS members and perform global changes on partition data sets, according to the vendor.

VSRCH and VXREF are priced at $5,900 each.

MB & Associates, Suite 300, 97 S. Nome St., Aurora, Colo. 80012.

APPLICATION PACKAGES

■ National Business Systems, Inc. has announced that its Total Office Support System (Toss) now supports electronic mail for documents created on IBM Personal Computers or on word processors attached to Wang Laboratories, Inc.'s VS minicomputers.

According to a spokesman, the enhancements allow documents created on a VS word processor and IBM Personal Computers equipped with a Digital Communications Associates, Inc. Irma communications board to be transmitted to a mainframe and distributed to designated recipients by Toss. Documents initiated by Toss users can be transmitted to the Wang and IBM micros for formatting or inclusion into longer reports.

Toss is priced at $15,000 for the DOS version and $36,000 for MVS. Leasing is available for $500 per month for DOS and $1,200 per month for MVS. The Wang VS and IBM Personal Computer interface prices, based on configuration, begin at $3,700 for DOS and $7,200 for MVS.

National Business Systems, Avon Park S., 30 Tower Lane, Avon, Conn. 06001.

■ Calma Co. has announced Release 3.1 of its Tegustation computer-aided engineering software for integrated-circuit and printed-circuit board design performed on Apollo Computer, Inc. Domain workstations. The software now supports Apollo's Aegis 5 operating system and the Apollo Domain DN 320 model workstation, which is a DN 300 with a floating-point processor.

The Tegate schematic capture graphics function in Tegustation 3.1 now supports very large-scale integration circuit design. In addition, 1,400 system-level simulation models are said to be available.

Stand-alone models of the Apollo workstations with Release 3.1 of Tegustation cost from $24,500 to $44,000 for Apollo DN 300 and DN 320 models, $74,500 to $98,000 for Model DN 400s and $60,000 to $108,000 for Model DN 660s, depending on system configuration.

Calma, 501 Sycamore Drive, Milpitas, Calif. 95035.

■ RTC Systems, Inc. has announced RTC/36 Security and Help Text Control software. The package provides multiple layers of security and Help text on the IBM System/36.

Written in IBM's RPG-III, the product provides five levels of security control: password and user identification, organizations, menus, program fields and screen fields. Users can design and modify user access levels, the company's organization structure, menus, program levels and data field access.

Help Text is user defined, on-line and real-time, the vendor said. It assists users with step-by-step instructions.

Features include customized content and command keys and highlighted instructions.

The product costs $995, according to the vendor.

RTC, 600 West St., Mansfield, Mass. 02048.

■ Design Consultants, Inc. (DCI) has announced Release 5 of its Project Monitor project control software, which now runs on Hewlett-Packard Co.'s HP 3000 and Wang Laboratories, Inc.'s Wang VS series computers.

Also available for IBM mainframes, Project Monitor reportedly allows users to set up projects independently or from an established methodology. It facilitates data preparation for scenarios that test the impact of new projects on existing schedules, the vendor said. Project Monitor can also be used to update a centralized data base for tracking corporate projects.

The product costs $12,700.

DCI, Suite 226, 100 Progress Pkwy., St. Louis, Mo. 63043.

■ Polygon Associates, Inc. has introduced VAXFR, software that permits data sharing and file transfer between Digital Equipment Corp. VAX computers and a variety of microcomputers.

When used with Polygon's Poly-COM or Poly-XFR terminal emulation and file transfer products for microcomputers, VAXFR permits bidirectional file transfer and allows users to back up personal computer files on the DEC VAX. It also enables users to conduct direct transfer of personal computer files to and from VAX electronic mail systems and perform direct spooling of personal computer files to VAX printers, according to the vendor.

Continued on page 68

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SOFTWARE & SERVICES

Continued from page 63

Poly-COM and Poly-XFR cost $585 each, run on HP 150 and HP 110 micros, the DEC Rainbow and the IBM Personal Computer line. VAXFR is free.

Polygon Associates, 1024 Executive Pkwy., St. Louis, Mo. 63141.

■ **Calma Co. has introduced a computer-aided engineering and design system for heating, ventilation and air-conditioning (Hvac) applications.**

Dimension III Hvac Design Package is a three-dimensional system for use with Calma's Dimension III system software that runs on 32-bit Digital Equipment Corp. VAX machines or Apollo Computer, Inc. systems. The Hvac package combines systems diagram, three-dimensional computer modeling, material selection and control and drawing production capabilities.

Other features of the system include a component library and display functions for drawing and editing.

The Dimension III Hvac system costs from $12,000 for Apollo systems to $60,000 for DEC VAX systems.

Calma, 501 Sycamore Drive, Milpitas, Calif. 95035.

DATA BASE MANAGEMENT SYSTEMS

■ **Battelle Software Products Center has announced that its Basis data management system is now available for Digital Equipment Corp. VAX processors under AT&T Unix System V.**

Basis also runs on a variety of minicomputer and mainframe systems, including Prime Computer, Inc. minis and IBM mainframes under IBM's VM and MVS operating systems. The product costs from $15,000 to $38,000 depending on hardware configuration.

Battelle Software Products Center, 505 King Ave., Columbus, Ohio 43201.

■ **CRI, Inc. has announced Release 4.5 of Relate/3000, a relational data base management system and fourth-generation language for Hewlett-Packard Co. HP 3000 systems.**

Enhancements to the product include optional crash-proof access; expanded index support that permits the definition of up to 30 indexes per file; improvements to concurrent, multiuser access functions; and the ability to add fields without reloading a file. Relate/3000 costs $18,500.

CRI, 5333 Betsy Ross Drive, Santa Clara, Calif., 95052.

LANGUAGES

■ **Honeywell, Inc. has announced the Gcos 6 Ada Compiler System, validated by the U.S. government's Ada Validation Office, for use on its DPS 6 family of small computers.**

Honeywell's Ada Compiler System conforms with Ansi/MIL/STD-1815A specifications. In addition to the compiler, the Gcos 6 Ada Compiler System includes Ada Linker, Ada Symbolic Debugger, Package Standard Builder, Program Library Manager and Program Library Utilities. The Gcos 6 Ada Compiler System costs $13,475.

Honeywell, 200 Smith St., Waltham, Mass. 02154.

■ **EVB Software Engineering, Inc. has announced the Generic Reusable Ada Components for Engineering (Grace), which was designed to aid Ada users developing applications.**

The software runs on any processor that supports a full implementation of the Department of Defense's Ada, including the Digital Equipment Corp. VAX series and the Data General Corp. MV/Eclipse series.

According to a spokesman, Grace software enhances the development effort of more experienced Ada users by removing the need to code low-level components. The Grace software license authorizes

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each customer site to copy the software and documentation without limitation, providing the copies are not transferred to other sites or resold.

Components are delivered with documented source code, design documentation, an example of the component's usage in larger applications and EVB's in-house coding style guide.

The cost per individual component is approximately $100.

EVB Software Engineering, Suite 701, 451 Hungerford Drive, Rockville, Md. 20850.

■ **Productivity Products International, Inc. has announced an enhanced version of its Objective-C compiler, which supports the C language, plus message and object extensions developed by Productivity Products.**

Objective-C is available for AT&T Unix-based processors.

Prices for Objective-C range from $400 for the IBM Personal Computer to $7,200 for the DEC VAX-11/730. Users receive a reference manual, executable code on floppy disks or magnetic tape, two libraries of reusable components to build a compiler or new products and an introductory course.

Productivity Products International, 27 Glen Road, Sandy Hook, Conn. 06482.

■ **Masscomp Co. has introduced Fortran 3.1 for its MC-500 series of minicomputers. According to the company, the Fortran release reportedly increases the floating-point performance of its Motorola, Inc. 68000/68010 microprocessor-based systems.**

The new version includes an enhanced symbolic debugger, access to window manager and access to the AT&T Unix profiler.

The product will be available in February and is standard on all Masscomp systems. Base price of a Masscomp system is $25,900 and can range up to $150,000 depending on the disk, tape and configuration.

Masscomp, Suite 200, 124 Mount Auburn St., Cambridge, Mass., 02138.

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REMOTE COMPUTING SERVICES

■ **NL Baroid has introduced an expert system-based service designed to decrease the risk of problems in oil field drilling operations.**

Mudman is a computer-aided drilling diagnosis system that allows an NL Baroid representative at the well site to enter data about drilling fluids into a portable computer in the field.

The data is transmitted to a Digital Equipment Corp. VAX-11/780 computer at NL Baroid's Houston headquarters, where an expert system recommends solutions to the problem.

Cost of the Mudman service is $350/day.

NL Baroid, P.O. Box 1675, Houston, Texas 77251.

ON-LINE DATA BASES

■ **BRS Information Technologies (BRS) has introduced an on-line information retrieval service for word processing systems and microcomputers that use asynchronous 300 or 1,200 bit/sec. modems.**

BRKTHRU is a bibliographic search service that gives users access to more than 65 data bases stored in a BRS central computer. Subjects covered include business, finance, science, technology and medicine. The service is available for a one-time fee of $75, according to the vendor.

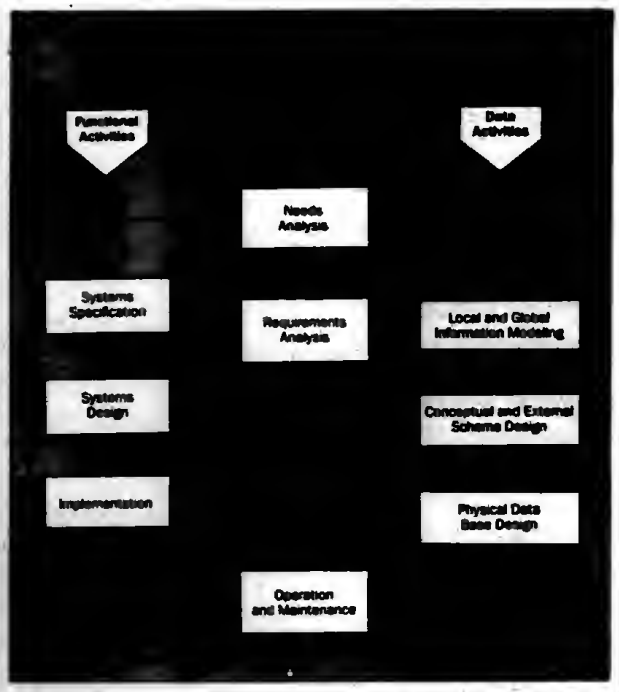
BRS Information Technologies, 1200 Rt. 7, Latham, N.Y. 12110.

METHODOLOGIES

■ **Database Design, Inc. has announced Version 2 of its Information Planner package for automation of strategic data planning methods. The product runs under IBM's OS and MVS operating systems.**

A spokesman said Version 2 identifies specific data base components and related applications that should be implemented as a single development project and ranks all such projects by their contributions to corporate goals. Other enhancements in

Continued on page 68



NBS from page 55

the data structure can be supported in any environment, the NBS said.

According to the guide, the logical data base design should be an integral part of the life-cycle development of the information system. The NBS guide recommended that logical data base design work be performed concurrently with requirements analysis and system design and before the physical data base design.

Specifically, the logical data base design methodology has four phases:

■ Local information flow modeling, in which data flows are modeled for individual applications.

■ Global information flow modeling, in which the individual data flows are modeled together for a view of the entire system.

■ Conceptual schema design, where data within the data flows is defined in terms of its functional use.

■ External schema modeling, where data is modeled from the point of view of the user.

The result is that all of the subsystems, data flows, data structures and user views of the data bases are described before the data base is physically designed, the guide said. Because the logical design process is done iteratively, there exists "a means for verifying the results of the different phases against one another," the guide said.

> ❞
> *The logical data base design should be an integral part of the life-cycle development.*

The NBS researchers also recommended the use of an automated data dictionary system to handle conveniently and accurately the volume and complexity of design documentation.

The NBS publication, "Guide on Logical Database Design," is available for $4.50 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Order by stock number 003-003-02631-0.

Continued from page 67

the release expand the software's reporting capabilities, increase tolerance of accidental interruptions and simplify data exchange with external software products, according to the vendor.

Information Planner 2 is priced at $35,000.

Database Design, 2020 Hogback Road, Ann Arbor, Mich. 48104.

■ **Marium Management Corp. has introduced a methodology for generating end-user documentation on standard word processing systems.**

The User Guide Generator (Uggen) provides document writers with a methodology that includes standards and a library of formats to design, administer and produce documentation for automated and nonautomated systems, a spokesman said.

Uggen identifies participant responsibilities, establishes standards and defines deliverables in a life-cycle methodology, the vendor said.

The product is priced at $35,000.

Marium Management, P.O. Box 66, 3072 Crompond Road, Yorktown Heights, N.Y. 10598.

TRAINING

■ **Control Data Corp. has announced a microcomputer-based computer-aided design and drafting training course developed by the company's Computer-Integrated Manufacturing (CIM) Division using its Plato computer-based training methods.**

The 22-hour Plato computer-based course trains a user to construct, manipulate, dimension, display, file and retrieve parts and production drawings. Titled Icem Design/Drafting, the course trains users in CDC's Integrated Computer-Aided Engineering and Manufacturing (Icem) software.

Users study material on an IBM Personal Computer or compatible. Exercises are completed using a computer-aided design workstation. A set of disks and laboratory workbooks are provided.

The price for the Icem Design/Drafting course is $500.

CDC, CIM Training Delivery, ETC331, 1460 Energy Park Drive, St. Paul, Minn. 55108.

■ **Science Research Associates, Inc. (SRA) has introduced a tutorial for users of IBM's Displaywrite 3 word processing package.**

"Using Displaywrite 3" is a 20-hour, two-volume course for use with the IBM Personal Computer. The first volume teaches users to create, print, revise, format and paginate documents. Volume two instructs users on revising complex documents, merging text, spelling checks, diskette formatting and using utilities and directories.

The tutorial costs $300 and includes two handbooks, an administrative guide and four training diskettes.

SRA, P.O. Box 5380, Chicago, Ill. 60680.

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10,000 MIS/DP executives read *Computerworld Australia* each week. *Computerworld Australia* covers new products and services, current applications and industry trends. *Computerworld Australia* subscribers will also receive *On Communications*, a quarterly publication for communications professionals which helps readers plan their communications strategies. And, on the third Friday of each month, an additional 12,000 readers receive *Australian Microcomputerworld*, a supplement with in-depth information on the microcomputer industry.

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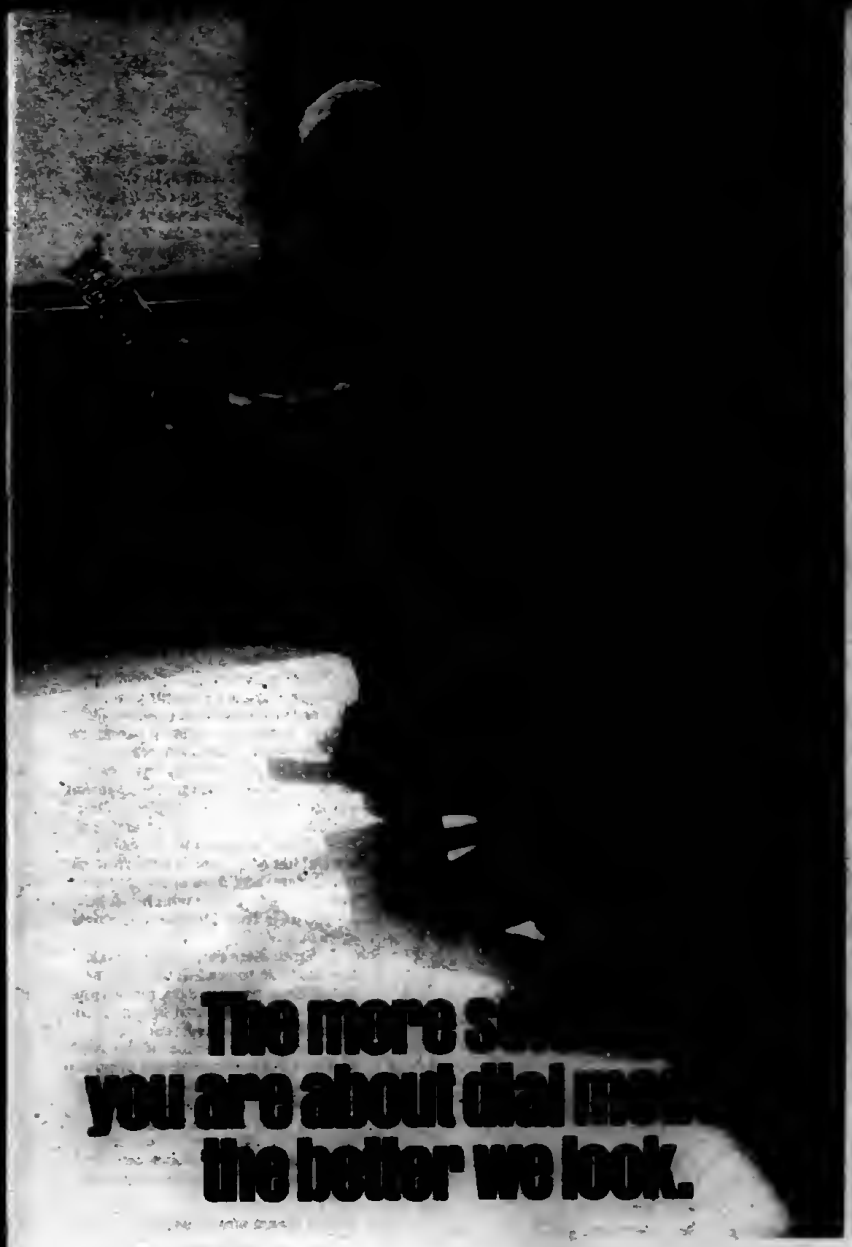

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vide information to assist the conversion.

The next phase of a conversion project involves collecting necessary conversion materials. These include a file layout, a partial file dump, systems documentation and, if possible, a data dictionary of the applications to be converted.

Programmer verification

A programmer should be assigned to verify that each field on the file layout corresponds to the test conversion tape, so that discrepancies can be resolved before testing begins.

At the same time, systems analysts can evaluate data element relationships between the old and new systems, evaluating each data element in the old system and finding its counterpart in the new one. It is important to weigh each data element on its own merits. Should it be converted? How?

Careful evaluation is particularly essential with financial data since field sizes vary from system to system. When a one-to-one correspondence between an old and new data element cannot be established, further analysis, and perhaps a policy decision on the part of the institution, may be required.

> ***The systems conversion process should begin with a formal conversion definition. The conversion team's charter should specify the scope of the conversion as well as the time allotted for it.***

Lead analyst's documentation

Throughout the conversion, the lead analyst should be responsible for documenting the analysis in a functional system design format. One form of documentation could be a cross-reference functional system design incorporating four columns.

The first column shows the location of the data element in the old system by position and data name, while column two gives the field location of that data element by data name and position in the new data base. The third column provides users with the user-friendly, or common, name of the data element. It may also identify the screen or form used for entering the data. Column four describes the operation that will transfer data elements to the new system.

The functional system design should be completed in a building block fashion, and it is useful to take an incremental approach to its approval as well, with users reviewing each logical section of the design as it is finished.

Once approved, the requirements are then frozen.

To reduce problems resulting from altering requirements after review, set up a formal change-control procedure to consider and ratify any proposed revisions.

Once the functional system design is under way, programming can begin for the conversion process. Of course, a complete system cannot be written before requirements are fully defined. However, some features of the conversion are apparent before the design is complete. These include output, the format and content of the new data base; input, a partial list of incoming data from the old system; and data elements, such as a customer name, which can be moved as is from the old to the new system.

Programmers can set up a skeleton program to read data from the old system, process data for obvious "move as is" cases and format it for input into the new system.

Then, as each section of the system design is approved, the programmer can concentrate on fine-tuning programs instead of starting from scratch. This process makes for a more rapid conversion, since design and program development can progress concurrently rather than serially.

Test to ensure effectiveness

As soon as all conversion programs have been written, a test conversion should be performed. The test ensures that the programs are effective and verifies the accuracy of the test conversion materials.

For banking applications, for example, conversion materials should include data in a readable format for each account; totals by branch and instrument category, along with a grand total; and a dump of the first 50 records from the conversion tape, to allow the programmer to validate record formats.

Once dollars and number of accounts balance, a full-fledged test conversion can be tried. Validation of the test conversion is identical to any other test. Each data element of a random sample of converted accounts is checked, along with sub- and grand-totals for dollars and number of accounts.

Once all these procedures check out, full conversion of the live data base can begin.

Rothschild is senior banking consultant for Computer Task Group, Inc. He recently directed the conversion of all commercial bank applications for a newly established bank.

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The time has come for straight talk about database management systems.

"The only reason to buy a database management system is to build better applications."

Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

With a comprehensive database management system and the appropriate tools like the kind I'm talking about, you'll make the data processing department a *strategic asset* instead of corporate overhead. You will make your company succeed in a highly competitive world.

In Cullinet's new Annual Report, Presidents and CEO's of major corporations speak about the positive impact Cullinet has had on their operations. For a copy that you might like to read and pass along to your company president, write to me. I'll see that you get one.

John J. Cullinane
Chairman of the Board

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of on-line and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

Cullinet

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One year ago...

Development had progressed so well that we expanded our efforts to include the entire SAS System on a PC, written in C. And to insure that the language, syntax, and commands would be identical across all operating systems, we decided that all future versions of the SAS System—regardless of hardware—would be derived from the same source code written in C. That meant that we needed a C compiler for IBM 370 mainframes. And it had to be good, since all our software products would depend on it.

So we approached Lattice, Inc. and asked if we could implement a version of the Lattice C compiler for IBM mainframes. With Lattice, Inc.'s agreement, development began and progressed rapidly.

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IN DEPTH

Part 1

By Ken Orr

Information systems managers today face four monumental problems: too much to do, too little time to do it in, too few good people and too many options. Industry experts say there's a software crisis, but in reality what exists is a software *management* crisis.

The pressures have created what appears to be an either/or choice: Cut the applications backlog by developing software faster or lift the maintenance burden by improving software quality. Presumably, the choice will dictate the action: To make better use of traditional systems development methodologies; to implement a more advanced, structured systems development methodology; or to take a fast-track approach with fourth-generation languages, prototyping and high-speed analysis. But these options aren't necessarily mutually exclusive.

This two-part series points the way to managing the software crisis. It is intended

to provide a framework for the information systems manager to make intelligent decisions based on current trends and future directions in information technology. Part 1 defines the major trends in systems development methodologies over the last 15 years. Part 2 will look at three case studies and explore how organizations can take advantage of future advances in systems development methodologies and tools such as computer-aided software engineering.

Information systems managers today have enormous problems and opportunities. Their job is to harness the most important technology of the 1980s — information technology — and at the same time provide continuity with past investments that their organizations have made in information systems.

Clearly, there is no need to restate the impact that information systems technology has had upon modern business nor the potential that lies ahead. But in their enthusiasm, many people overlook the difficulties involved in managing this kind of technological change.

Because computers and software have become so powerful, top management has found more ways to employ computers for business purposes. That means an increasing amount of work for those involved. A recent survey found that application backlogs increased from 19 to 27 months in the last year.

Not only are there more new applications to program, but, unfortunately, there are still all the existing systems that have to be maintained. Industry estimates indicate that somewhere between 50% and 80% of software expenditures are tied up in maintenance of systems, a cost that is often higher than it should be because of the poor quality of existing software.

As the business environment becomes more volatile, the need for faster systems development increases. The competitive edge often hinges on time. As a consequence, the information systems manager is squeezed between his desire to produce quality systems and the needs of the business to bring systems on-line quickly.

The growing demand for information systems has also put a strain on the ready resource of skilled information systems professionals. I have yet to encounter a manager who would admit that he has enough good analysts or programmers. Department of Defense statistics show that there is currently a deficit of more than 100,000 software engineers, and that deficit may grow to 800,000 by 1990 unless new techniques are found to produce quality software more efficiently.

Finally, to complete our litany of management problems, the expansion of the information systems world has encouraged thousands of organizations to develop products for the information systems marketplace.

Francis Frank, vice-president of sales for Keane, Inc. of Boston, estimates that there are more than 40,000 applications packages available today.

Not only are there thousands of software packages for every imaginable need, but there are also hundreds of computers, operating systems, data bases and systems development methodologies — an overwhelming array of options.

It is possible to make a case that today's information systems technology is simply too much of a good thing. Improved technology is only valuable if it can be brought under effective management control, and a great many information systems managers today are having difficulty controlling the productive use of information technology.

Roots of growth

Quality and control are the roots of systems development methodologies. During the '70s, systems development methodologies became especially popular in organizations having trouble controlling the software development process. Software projects were getting larger, and many of the people involved were not trained or experienced in either project management or software development.

The defense community had developed a variety of tools and techniques for managing and controlling large hardware development projects, and the first commercial systems development methodologies translated many of these ideas

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directly into software terms.

Results were mixed, however, when traditional software techniques, such as interviewing, general design, detail design and flowcharting were coupled with large numbers of project management forms (Figure 1). Management believed that it had better control of the software process, but in many cases, systems development methodologies became synonymous with paperwork and antiquated software development techniques.

For the most part, the first systems development methodologies did not attempt to solve any serious technical problems involved in the development of the structured, distributed, online, data-based systems of the '70s and '80s. They assumed, wrongly as it turned out, that most large organizations had staffs of trained programmers, analysts and data base professionals who already knew how to design state-of-the-art systems. All that was needed was better project management.

Although many organizations, particularly large ones, installed traditional systems development methodologies, they were often abandoned in practice.

Structured revolution

In the early '70s, at about the same time that the first, or traditional, systems development methodologies were beginning to be marketed commercially, a number of new ideas about software development were introduced. The application of these new ideas led to what has been called the "structured revolution."

The structured revolution began innocently enough by proposing the use of structured programming, but it also introduced a number of new concepts. A radically different waterfall chart arose in which top-down development comprised design-a-little, code-a-little and test-a-little techniques. Over time, however, there was a return to a more traditional view, with analysis or requirements definition playing a more important role up front.

Where the traditional systems development methodologies had stressed management control, the structured systems development methodologies stressed software quality. Structured programs were better because they were easier to maintain — they placed an emphasis upon requirements definition and design. And where traditional systems development methodologies had emphasized the use of forms, structured systems development methodologies emphasized the use of tools, especially graphics tools.

Where traditional systems development methodologies were targeted largely at managers, structured systems development methodologies were aimed largely at technicians: analysts, programmers and others. And where traditional systems development methodologies had emphasized standards manuals, structured systems development methodologies emphasized training.

The experiences with structured systems development methodologies, although mixed, were largely favorable. In general, programming improved, along with requirements definition, but structured systems development methodologies required much more work on the front end of the project. This caused conflict with traditional management techniques that encouraged early coding and testing.

Indeed, many of the most severe problems of the structured revolution occurred between the professionals who began using and promoting

Figure 1

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> *Structured systems development methodologies are front-end loaded, and so a considerable amount of analysis and design are done before the user sees any results.*

structured programming and their managers who had been brought up using more informal techniques.

Process vs. data

In the beginning of the structured revolution, there was more or less universal agreement over what constituted structured development: top-down development, goto-less programming, structured walkthroughs, chief programmer teams and documentation libraries. Those promoting structured systems development methodologies quickly broke into different camps, however, with one camp favoring the more traditional process-oriented analysis and design and another favoring data-oriented analysis and design.

The process-oriented structured systems development methodologies advocated studying the existing process in an organization and modeling the process in the design (Figure 2). They advocated modular design based on widely accepted principles. The process-oriented approach most widely used was the one advocated by DeMarco, based on the works of Ross, Constantine, Yourdon and others.

The data-oriented camp was highly influenced by data base theory and practice. Data, this camp advocated, was the key to everything. Data is stable, while process changes continually. The data-oriented structured systems development methodologies advocated studying the data of an application, especially the outputs and data base, as a means of modeling the system. Data structured design made it possible to derive the structure of the programs directly from the structure of the data (Figure 3).

Another feature of the data-oriented approach was the emphasis on defining the results (outputs) in the requirements definition phase and then designing back to front, from outputs to data base to inputs. Data-oriented systems development methodologies focused first on logical and then on physical design, on designing the data base first and then the processes to access that data base.

Over time, the process- and data-oriented methodologies began to converge as each approach matured. In general, the process-oriented structured methodologies were more widely adopted, but with the increasing popularity of data bases and fourth-generation languages,

Figure 2

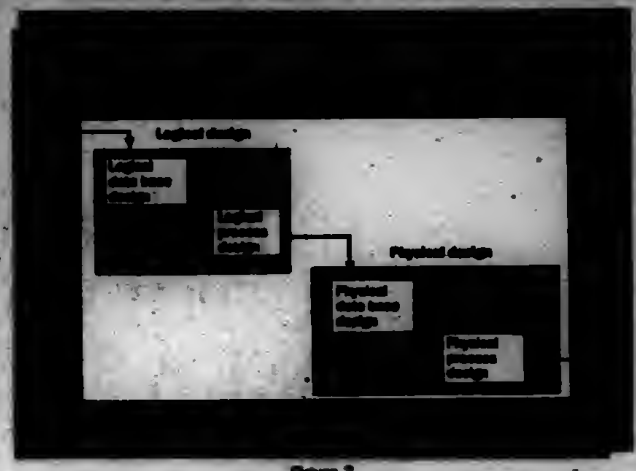

Figure 3

which are largely data-structured languages, more organizations are now moving to data-oriented systems development methodologies.

Some problems

Although the experience with structured systems development methodologies has been extremely positive, there are problems. Structured systems development methodologies are front-end loaded, and so a considerable amount of analysis and design are done before the user sees any results.

In many environments, it is difficult to get users and/or management to accept the time allocated for requirements and design, especially without a careful implementation plan that stresses training, consulting and the use of automated tools to support a new approach.

Another problem is that structured approaches use new tools, especially graphics tools, for defining and designing systems. These new tools make it much easier to capture user requirements, but until recently, they have not been able to capture the requirements in a machine-readable form so that they can be maintained.

The good news for structured systems development methodologies is that the systems developed using these techniques are usually considerably easier to code, test and maintain. Because of the time spent to get good requirements and develop a good design, testing, implementation and maintenance time is reduced, resulting in higher productivity. The new computer-aided software engineering tools make the process of structured development considerably easier.

During the period in which structured systems development methodologies were beginning to gain acceptance, a new set of fast-track development tools and techniques were becoming popular as well. These included fourth-generation languages, rapid prototyping and high-speed analysis.

Fourth-generation languages — the best known and most widely accepted of these techniques — evolved from the work done in the '60s and '70s on report generators, screen generators and data base management systems. These languages took advantage of the fact that a great many tasks in data processing are common.

By taking these standard functions and developing user-friendly languages to interface with standard data bases, fourth-generation languages could cut by a factor of four or five the amount of code required to do standard data processing applications, such as producing reports or filling out basic data entry screens.

Not only were fourth-generation languages more productive for certain classes of problems than traditional systems development methodologies, they were also aimed at a larger audience than traditional procedural languages.

In large part, fourth-generation languages grew out of the attempt to develop languages that could be used by managers and clerks without the assistance of programmers. As a consequence, many fourth-generation language systems have been developed by users.

Rapid prototyping

Because fourth-generation languages made it possible to develop systems, at least small systems, much more rapidly than was possible using traditional languages, the idea of rapid prototyping as a means of defining requirements was a natural consequence. Why not, fourth-generation language proponents asked, use these languages in work with users to develop prototypes of the systems to be developed? That way, the user would have a much better feel for the system that would be delivered.

Some proponents of rapid prototyping suggested that with fourth-generation languages, it was no longer necessary to go through the time-consuming process of developing formal requirement specifications.

Instead of the traditional waterfall process, a new operational life cycle emerged based on iterative development.

Iterative development usually means that the user develops a prototype of the desired system until he is satisfied with it; then the prototype is tuned until it performs satisfactorily or until the user identifies additional requirements. The danger lies in the possibility that the

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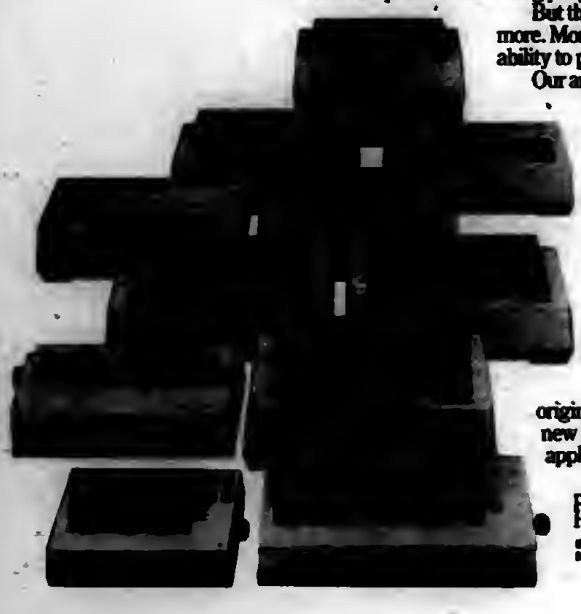

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prototype never becomes a finished system.

Fast-track development emphasizes speed and early user involvement. When the user is brought into the process early on and given tools to see immediate results, he has much more control of the systems development process than was the case in the traditional life cycle. As a consequence, however, prototyping works best when restricted to small systems with one (or a small number) of users.

High-speed analysis

High-speed analysis, a slightly more advanced version of prototyping, is effective when applied to medium-size systems with several users. High-speed analysis involves a group approach. Users are brought together for an intense, three- to five-day session in which they define the system's primary inputs, outputs and data base. Normally, these sessions are conducted by an outside facilitator who structures the sessions and keeps things on track.

In high-speed analysis, prototypes (or at least mock-ups) ensure that users understand what they are getting (Figure 4). One of the advantages of this approach is that users have the opportunity to hear what other users of the system think the system should do. In these sessions, conflicts arising from differing user viewpoints are often identified and resolved before they become expensive mistakes.

Recently, various proponents of fast-track development tools have put them together as an alternative to the traditional systems development methodologies or structured systems development methodologies. Fast-track development eliminates many of the problems that users and managers have with more rigorous approaches.

Users and managers get almost immediate feedback on the nature of the system — there is no long lead time between the beginning of the project and when the user sees results — and the need for documentation is almost nonexistent.

There is a need to improve both the quality of information systems today and the speed with which they are developed. Unfortunately, many look at these goals as incompatible. They see fast-track development as a total replacement for structured systems development methodologies. In practice, the situation is not so clear.

About the author

Ken Orr, president of Ken Orr & Associates, Inc., is one of the principal developers of the data structured systems development methodology.

Orr has held various positions, including vice-president of Advanced Systems for Langston, Kitch and Associates, Inc.; director of information and communications for state government; vice-president of a management consulting firm and manager of software development for Service Bureau Corp.

He is the author of Structured Systems Development, Structured Requirements Definition *and* The One Minute Methodology.

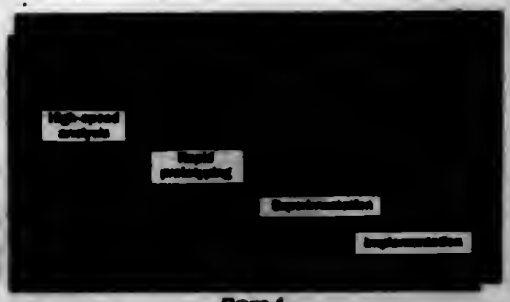

Figure 4

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The House That 1-2-3 Built

By Eric Bender
Senior Editor

Lotus Development Corp.'s millionth software package rolled off the assembly line and into the hands of the governor of Massachusetts. Television ads accompanied shipments of Jazz software. The company shifted its headquarters into the Lotus Development Building, a mammoth eight-story facility on the Charles River in Cambridge, Mass. And at a festive annual meeting, executives remarked that the company achieved $301,000 in revenue per employee in 1984.

In short, May was an average month at Lotus, which celebrated its third birthday in April and employs roughly 900 people worldwide.

Lotus' meteoric rise — from start-up to leading vendor of microcomputer business applications and then to world's largest independent software vendor — was fueled primarily by one star product, the 1-2-3 integrated analytical package.

Now 1-2-3 has been joined by two five-function applications — Symphony for IBM Personal Computers and Jazz for the Apple Computer, Inc. Macintosh — which are pulling in significant revenues. Many other packages are being readied for the market.

But just as important to Lotus' future is diversification. "We're broadening out of software into the information industry," President Jim Manzi emphasizes. "That's first and foremost on the list of objectives."

The pending acquisition of Datapeed, Inc., whose equipment lets customers receive real-time stock quotes via FM broadcasts, is the prime example of this shift, Manzi says. "We want to be in the services business, which includes data provision and content analysis that you do with software," he says. "The diversification with Datapeed is absolutely critical."

"We will continue to build our core business of productivity applications for personal computers," says Chairman and founder Mitchell Kapor. "We will continue to amplify the service components of that business, and we will selectively have new offerings that have service for a profit. That allows us to leverage our strengths, which are our customer base and our expertise in building applications."

(Continued on ID/13)

A conversation with Mitch Kapor

"In the applications arena, Lotus is clearly in a market leadership position, and our goal is to stay that way. We expect competition from a variety of sources that may include Microsoft, Cullinet, IBM, two guys in a garage. We can't afford to be complacent."

CW PHOTO BY BOB O'DONNELL

How has Lotus changed in the last year?

First of all, it's a lot larger in revenue and in head count. We have started divisionalizing the company, which is a very major organizational change. We are much more stable, partly because the micro software industry has shaken out to a large degree.

I think there is a perspective shift: How are we going to climb the next mountain? That's a question that we weren't asking ourselves a year ago. We had a one-product-at-a-time focus a year ago. Now we have a focus on growing entire new product lines while we protect the core business. It is a very major shift in perspective, sort of going from a local outlook to a more global outlook.

What's the focus that ties together the Datespeed acquisition and the other recent corporate moves?

We are selectively expanding the role that we will play as a player in the information industry, which is to say we will build upon our base as a personal computer software company, in fact as the leading company, to leverage our assets. In other words, what are we good at, and what do we have?

First of all, we have about a million happy customers. So to the extent that we can identi' needs they have that are not currently being served, we can create new applications or new classes of software applications for them. Part of what I'm doing are these textual productivity tools that have some artificial intelligence aspects to them. A number of the development alliances we have made with Jon Sachs, Ray Ozzie and Jerry Kaplan will come out as products.

At the same time, we are going to expand our markets selectively to segments that we're not serving directly but where our applications and service expertise can be brought to bear.

We identify the engineering and scientific market as a clear case where there is about a 20% overlap of customers today, of engineers, scientists and technical professionals who use 1-2-3 and Symphony. That still says that we are in the software and services business, but in an expanded fashion.

What kind of services will become important for Lotus?

Substantially all of the offerings we have today are software products. Although they are products, they come with a high degree of service of various kinds, whether it's the hot line or the courseware and so on. Our goal there is to have appropriately complete service that supports our products. The [Lotus] magazine is an excellent example of a service vehicle that, by the way, we expect to pay its own way.

I would contrast that with Datespeed, where the business is a service business. There is a software component — the software that will go on the personal computer to interpret and allow you to manipulate the real-time stock quotes, and we are intending to use our expertise as an application company understanding the needs of and users — but what we are really selling is the service. That is a new kind of offering.

What are the top issues for your corporate customers?

The first thing is to recognize that a corporation that has hundreds or several thousand personal computers requires and deserves differentiated attention from us. Some of it just has to do with the scale of operation. There are logistical issues that need special attention — for instance, upgrades. If you have several hundred users out there and we are doing an upgrade, to force them to go through the same one-at-a-time procedure we would have for any other user doesn't make any sense. Or where they have an information center, that requires some differentiated treatment and support. So there is just a laundry list of attention to details.

The number two and three issues are protection and licensing, which go together.

We are hearing now a real attitude of extreme reasonableness coming from many individual large customers. I think it has been unfortunate that there have been some very strident voices that have not contributed to positive dialogue.

We are trying to understand how to strike the correct and mutually beneficial and productive bargain, which I think could take the following form — and I say "could" because we have not committed to this.

Protection could be partly contractual. Protection does not, in all cases, have to be encryption on the floppy disk or the equivalent. Large customers understand that in order for us to do business they have to be willing to shoulder some of the burden of responsibility for the usage of the product within their organization.

That comes down to some variant of "If you remove the copy protection, we will agree to be responsible to see that illegal copies are not made."

A bargain could be struck. But that ignores the subtleties and complexities of the issue, of which there are very, very many.

We are not inflexibly committed to copy protection as some sort of last stand, but we are committed to doing business in a way that we feel protects our economic interest.

We have gradually moved our position, as much as our customers have moved some of their positions. Nobody is going to be in business for a long time if they are not responsive.

There are two things that we won't do. We won't walk away from copy protection totally, and we won't enter into any agreement that allows for unlimited reproduction, which is just not realistic or reasonable.

It's also apparent to us that if a site license makes sense at all, it will only make sense if there are 500 or 1,000 or some fairly hefty threshold number of machines.

And there have to be adequate solutions in terms of copy protection in all of the other cases.

(Continued on ID/20)

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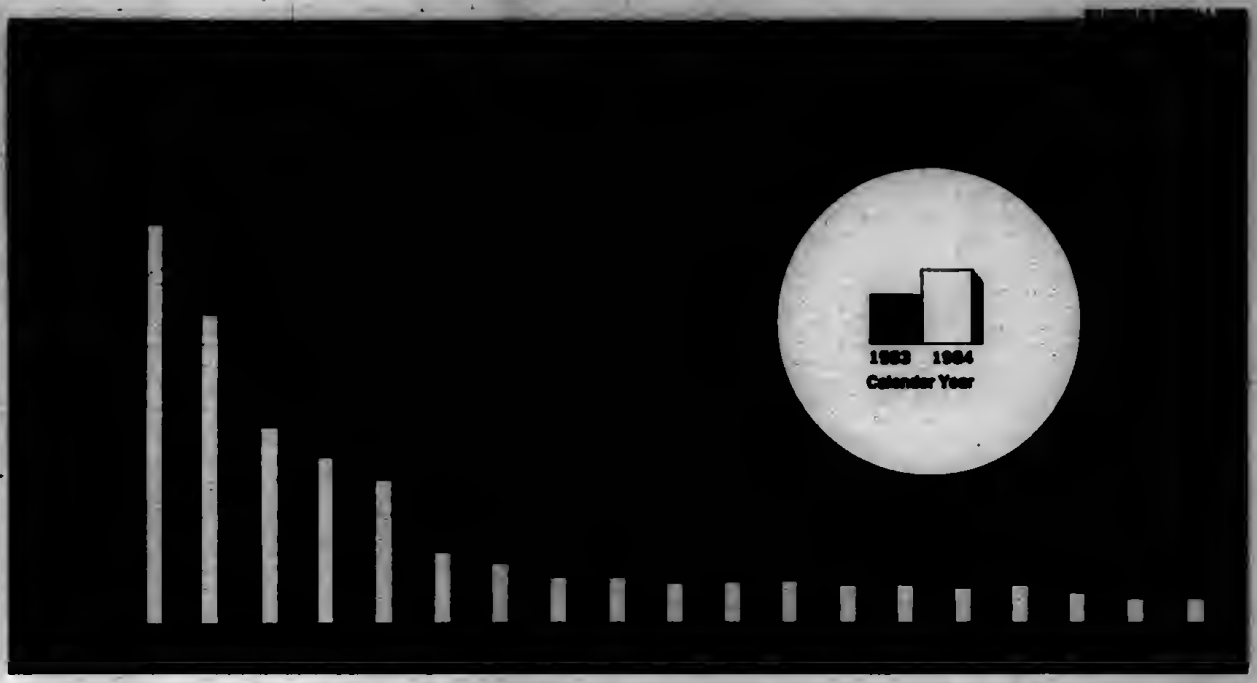

(Continued from ID/10)

Although a few recent moves, particularly the Dataspeed acquisition, have provoked some head-scratching among industry analysts, there is general approval.

"They've carefully mapped out a strategy to diversify their business," says Chris Christiansen of the Yankee Group.

"The only great danger I can see is that they're moving in so many directions they may lose their focus, but they know what they're doing," Christiansen adds. "They've gotten more flexible as they've gotten larger."

"They have a lot of good strategies in place," sums up International Data Corp.'s Aaron Goldberg. The biggest near-term danger, Goldberg says, is simply that "the personal computer market will go to hell and take them with it."

Getting started

When the personal computer explosion began in the late 1970s, Kapor, a Yale University psychology graduate who also studied at MIT's Sloan School of Management, worked at Personal Software, Inc. (the predecessor to Visicorp) as programmer and product manager. During that time, he developed two applications that he subsequently sold to Personal Software for $1.5 million.

Struggling to graph Visicalc spreadsheet results on an Apple II one day in 1981, Kapor hit on the idea of a package that would integrate multiple functions. He took the concept to software developer Jonathan Sachs, and they began working on what became 1-2-3, with Sachs acting as the lead developer. The two founded Lotus in April 1982.

Announced in October and shipped in January 1983, 1-2-3 was an instant success. Combining a fast and flexible spreadsheet with graphics and data base management functions, the package was one of the first really to take advantage of the IBM Personal Computer. Lotus' aggressive promotion efforts played a large role in its success, but word-of-mouth probably was more important, industry experts agree. And the timing was right.

"I don't think anyone is ever going to have a blockbuster like 1-2-3 again," Manzi says. "The timing was perfect, the product was perfect, IBM was just getting going, and the economy was going into an incredible upswing for three years. It was the greatest time in the history of the world to launch a product."

As 1-2-3 sales soared, Lotus also overcame the barriers that stopped many other promising software startups — carving various routes through the distribution channels, setting up manufacturing, establishing adequate customer support procedures, planning for follow-on products and dodging a host of other potential roadblocks. In 1983, its first full year of operation, Lotus reported sales of $53 million. In October of that year the company went public, raising more than $34 million.

Broadening product line

Announced in January 1984 and shipped the following July, the Symphony package pulled in more than $40 million in sales by this past April, Manzi says. The program was designed to accept add-in software modules (such as spelling checkers and Symphony Link, a micro-to-mainframe product), which also will bring in significant revenue, Manzi says. "Companies are buying large volumes of Symphony just on the strength of Symphony Link."

The 1-2-3 package is due for its first major revision this fall, and the upgrades will also pull in substantial sales, he says. "Companies would die for that revenue stream." Other announced products include a 1-2-3 report writer and the Spotlight desk organizer package Lotus received as part of its acquisition of Software Arts, Inc.

While acknowledging "that the rate of growth is fundamentally tied to new units of hardware going out the door," Manzi emphasizes the role of the new offerings. He also notes that he expects international sales, which accounted for 10% of sales in 1984, to grow faster than U.S. sales, perhaps pulling in 15% of revenue this year.

On the vertical market front, the new Engineering and Scientific Products Division, established in March, is beginning to target products toward the technical users who already account for approximately one-sixth of Lotus sales.

"We never asked these people to buy 1-2-3 and Symphony, but they

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went ahead and bought them anyway," says Sandra Gunn, vice-president and general manager of the division. "Some of them used 1-2-3 and Symphony the same way a general business user would, and others tried to do some wild and wonderful things."

This market shows "very high growth, very high dollars in terms of computer tools, but the real reason to get excited is the shift in technology that's going on," she remarks. "Engineers and scientists, being released for the first time with intelligent workstations, are going nuts. They love it. And unlike general business users, they're not intimidated by the technology."

Lotus will stick to its knitting, offering "flexible, powerful, generic microcomputer software that has hooks in it to other things," Gunn says. The first step? "We're going to tell engineers and scientists all about Symphony," she says. "Nobody ever bothered to do that."

Another move is toward strategic alliances with other vendors, the prime example being the cooperative effort to integrate Symphony with Cullinet Software, Inc.'s Information Center Management System software. Similar deals are under discussion with other large mainframe software vendors.

The Dataspeed acquisition represents a new direction for Lotus and gives several important benefits, says E. C. "Mick" Prokopis, senior vice-president for finance and operations.

"First of all, it provides us with a recurring source of revenue in the form of annuities," he says. "We haven't had that type of income." The move also provides a good matchup of strengths, adding Lotus's marketing, financial and development resources to Dataspeed's technology, Prokopis says. And "it further enhances our ability to sell products that are purchased more for strategic reasons than for tactical reasons."

The Dataspeed acquisition also comes with tax breaks that make it a bargain for Lotus.

Lotus is pouring substantial resources into creating future products, spending about 12% of first-quarter sales on research and development, Manzi says. Kapor personally supervises development, overseeing a large in-house group and a number of outside developers (see sidebar on ID/18). The first major results are expected to crop up in 1986.

> ***Like its competitors, Lotus is picking its way through a mine field of touchy and closely linked distribution issues: site licensing, the gray market and copy protection.***

Leveraging market advantages

The company doesn't expect any major inroads from 1-2-3 clones, says marketing vice-president Charles Digate. "We'd be remiss in not paying attention to those, but we understand what it takes to remain the dominant leader in that category."

One key is "new releases of our products that constantly leapfrog whatever a clone maker may decide to introduce," Digate says. "Anyone who would have a clone sitting on the shelf today would be quite surprised when they see the second release of 1-2-3. There's absolutely no way they'd be able to match that in a short period of time."

Because of this, "we obviously don't see any pressure today for moving the price of 1-2-3," he says.

Aside from product strength, Lotus enjoys major advantages over most competitors, including "the Lotus name, the support, the franchise with the dealers and the strong installed base," Digate maintains. The firm also can throw large resources into product rollouts, as in the case of Jazz.

Like its competitors, however, the company is picking its way through a mine field of touchy and closely linked distribution issues: site licensing, the gray market and copy protection.

As Lotus feels increasing pressure from corporate customers, establishing site licensing policies is a top priority, Digate says. "We're doing a lot of research to see what the needs are. . . . We've got some basic statements internally that we're all buying into. We have to work out a lot of details, organizationally and operationally, and after all that's done we can go to market with it."

Cutting in dealers

One prime concern is to continue to cut dealers in on all sales. While Lotus sold direct to large customers in the early days, that created severe conflicts with dealers, and in May 1984 Lotus announced it would push everything through the dealer channel. Among Lotus's own sales force, "we have more people than ever that penetrate the Fortune 1000 every single day," but all orders are turned over to dealers, notes Stephen Crummey, vice-president of sales and service. The main argument for this arrangement is that dealers provide support, but the logic may be more compelling for dealers than for corporate customers, industry experts outside Lotus note. Crummey acknowledged that "a lot of corporate accounts don't need support after they buy their nine thousandth 1-2-3," but he points out that "all corporate customers use dealers to one extent or another."

Even sophisticated products such as Symphony Link will be handled through resellers, Crummey says. "We're installing 3274 controllers in each field location for training on Symphony Link."

"There are 2,200 A-rated Lotus dealers and on average each of them

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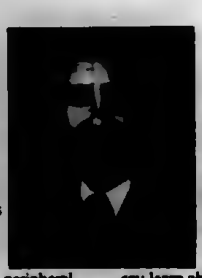

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has five outbound salesmen," Manzi estimates. "So we're talking 10,000 reps out there on sales and fulfillment mechanisms. That's reason enough to go through desiccr."

In April, Lotus intensified its efforts to shut down gray marketeers (who quietly buy products from authorized distributors or dealers and offer hefty discounts from the suggested retail price, often selling

> *Lotus consciously works to preserve the style of its early corporate life.*

through the mail) by serializing products and watching where they end up.

This program has shown some good early results, Cromwell says. "We will start policing the channels, and if necessary terminate people who are violating the rules."

Copy protection raises many other concerns and, sometimes, tempers. Lotus is studying a number of alternatives to its current software-based schemes, from the Adapso hardware key to potential contractual protection (see Kaper interview).

Mid-to-late adolescence

Manzi, who worked as a reporter and then as a McKinsey & Co. management consultant before joining Lotus two years ago as marketing director, describes Lotus as a company in "mid-to-late adolescence."

Lotus currently is being split into divisions, effectively establishing "smaller companies that are more comfortable and where the dynamics are more small-company-like," Manzi says. "The trick is to figure how to successfully run divisional structures, how to keep those alive and well, while maintaining the soundness of the company and not getting unbalanced."

Lotus consciously works to preserve the style of its early corporate life. One example is the informal companywide meetings, still held biweekly, although these days 500 people may show up. Another is the company's continued presence in not-yet-fashionable areas of Cambridge.

"There's still an enormous amount of excitement," Manzi says, which comes partly from new initiatives and partly from Lotus's high profile among microcomputer users. "People are looking to us to solve lots of thorny issues in the industry, as much as they're looking to IBM."

In the short term, even those who approve Lotus's new directions worry that sales slowdowns may loom. "A number of factors will start to erode the base that 1-2-3 has built up," Christiansen says. "Lotus doesn't have a real follow-on product; Symphony adds too much." Products now in development may be two years or more from commercial acceptance, and Lotus may see a slump in the interim, he suggests.

And while Wall Street sees the excitement, it hasn't shown up lately in Lotus's stock price.

In first-quarter 1985, Lotus earned $9.6 million on $44.7 million revenue, showing increases of 28% and 56% respectively over first-quarter 1984 results. The company was sitting on $98.6 million in cash and temporary investments. But the current price/earning margin is hovering around 16.

"When you look at companies with price/earning ratios of 16, you don't expect to see Lotus there," Prebaple says. "The investment community needs to see another four to eight quarters of continued favorable earnings reports."

However, Michelle Preston, analyst with L. F. Rothschild, Unterberg, Towbin, calls the current margin "ridiculous."

"I don't think Wall Street is really focused on Lotus's future as much as on what Lotus is currently doing," she says. "I see this year as a year of consolidation, and I look at next year as a major new product year for Lotus. Lotus and Microsoft have moved ahead of the pack."

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Kapor oversees unusual mix of R&D efforts

Stepping back from overseeing day-to-day operations, Lotus Chairman Mitchell Kapor "is now totally focused on managing development," analyst Michelle Preston notes.

Kapor acts as a hands-on manager for the company's far-flung software development effort, which supplements work by a large in-house staff with an unusual number of agreements with outside developers. "It would surprise people if they knew how much Mitch is personally responsible in some degree for Lotus products," remarks S. Jerrold Kaplan, Lotus's principal technologist.

Lotus's prime forum for product ideas is the "chairman's R&D group," which joins software luminaries such as Kaplan, Jonathan Sachs and Visicalc co-author Daniel Bricklin.

The group, which Kaplan describes as a cross between "a loose-knit group of gladiators" and a dinner society, typically meets with a rather short agenda. "The schedule is that they bring in food for dinner," he adds.

"Everyone in this company has got new ideas for products and new ideas for processes," comments Gabriel Baum, vice-president of product development.

"The chairman's R&D group is ideal for products to ferment and for acquiring new products from outside contacts.

"Lotus is not and never will be a totally formally structured place," Baum says. "It's likely that products will be taken all the way to the marketplace within the chairman's R&D group. Equally, we're all agreed that a number of products will be taken to a certain point and then the individual who championed one will turn and do something completely different.

"This company has grown hugely over the past three years, and to achieve that huge growth and put out product at the same time is a remarkable achievement," he points out. "But there's a price to pay for that achievement; you tend to get somewhat isolated groups, groups pursuing their own destiny. I'm anxious to eliminate those barriers."

In recent months, Lotus has announced a string of product development contracts with external developers, including several ex-employees such as Sachs. Among software vendors, signing up so much talent from outside the company is unique to Lotus, but the setup makes a lot of sense for both parties, Kaplan says.

Often, the best developers don't want to be employees, but they do want their creations to sell, he notes. And from Lotus's perspective, the moves neutralize some of the company's strongest potential competition.

At Lotus's annual meeting, Kapor listed four guidelines in the ticklish art of getting the most from these high-powered developers: give the developers autonomy, "let their products see the light of day," "let them share the fruits of their labor," and make sure "it's not just a great idea but it can turn into a great product."

Kapor's own software expertise is a major advantage in this role.

"Collaborating with him is just a pleasure," Kaplan says. "Give him half an hour with one of my programs and he understands it better than I do."

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FUSION

How DP keeps up with Lotus' growth

Hired two years ago, DP manager Dorothy Hodges describes herself as an old-timer at Lotus.

"I was told 'there is no data processing here, so go do it,' " she jokes. Since then, she says, Lotus has been "taking a natural evolution of MIS departments and scrunching it into a two- to three-year period."

When Hodges joined the software firm in June 1983, after experience as an IBM sales representative and a computer consultant with Arthur Andersen & Co., internal DP was "an order processing system and one person who was running a small System/38," she says. Hodges was given a September deadline to get an inventory system up and running.

"Taking my Arthur Andersen methodology, I threw it out the window and went on," Hodges says. "The methodology says it takes a year to do a systems plan and then define what you need. We did that in a month.

"Because we needed to do things so quickly, we had to go with packaged solutions," she explains. That search ended up with an integrated financial/manufacturing package that runs on a Digital Equipment Corp. VAX, "so then we got a VAX."

By the time the original VAX/750 was installed, "it was too small, because of the amazing growth curve, so we immediately ordered a 780, and that's how we evolved," she says. "Right now, we have three 785s here in the building in a cluster." The Lotus R&D group at nearby First Street offices also has a VAX, and two other VAXs are running at UK facilities.

Over the years, the internal DP group has grown to 25 employees, and the charter has spread to cover systems used for software research and development and data communications. However, Hodges does not have responsibility for the 800-plus personal computers at Lotus.

"One of my big projects is to implement an information center here, and I think it's going to make sense to roll the personal computers into that," Hodges says. "Right now, we don't have anyone who really plans for personal computers except on a hardware basis. It's an evolutionary thing, and I think it's evolving into an information center."

On the data communications side, asynchronous communications are provided through a Sytek, Inc. broadband network, now being placed throughout the new Lotus Development Building, with 800 network drops installed so far. Most users can get to the VAX by taking advantage of Symphony's terminal-emulation functions on their Personal Computers. Microcomputer local-area networks also will be attached, "so you can sit in your office and be on a local-area network, or you can call out to Compuserve or call to the VAX or to First Street or to England. We've been concentrating on getting all the transaction systems up," Hodges notes. "Now we're concentrating on getting some more management information to people.

"The VAXs were an appropriate choice, because we're clustering them, and if we need more hardware, we can buy it without having to spend millions of dollars," Hodges says. "But there may be good strong reasons that we get an IBM mainframe in the next year.

"We're facing some very large data bases," she points out. "Our end-user population is a couple of million people whom we want to be able to identify; we see that as a large competitive weapon."

Another reason for a mainframe purchase is that it would help to support Lotus' evolving micro-to-mainframe products for the company's R&D, field support and sales groups.

"So one potential scenario is having some large data base applications on an IBM mainframe and keeping the VAXs as workstations — the opposite of a traditional approach," she says. "The easy part is over. It was very clear what we had to do until now. Nobody questioned that we needed an accounts payable system."

The current challenge is determining priorities "and then, the traditional problem at Lotus, trying to predict the growth, because MIS can't react as quickly as some other groups," she says. "MIS has to be very close to the business strategy so we're there when we need to be."

Last month, Lotus took another step to boost MIS, appointing Jack Fuehr, who previously served as vice-president for data processing at Mostek Corp., to the new position of vice-president for MIS.

Dorothy Hodges

"We'll take care of your IBM system. Even when IBM won't."

(Continued from ID/11)

How is the Adapso technical proposal proceeding?

It is getting closer to full publication. Some very impressive progress has been made in reducing the likely costs of manufacturing these devices. There's some very innovative technology that is being donated by Apple, which I think is very exciting. There is active involvement by hardware manufacturers of all kinds — Hewlett-Packard, Apple and others that I can't name. If a protection port or authentication port could be built into a machine that would essentially add zero cost, software vendors and users would have more flexibility.

What's in it for the hardware suppliers?

Two things. One is that all of these hardware companies are also in the software business, and they can see the effects of software piracy on their software business. Software revenues are going to grow faster than hardware revenues in all segments, including mainframes, and a hardware manufacturer doesn't want to see its own growth opportunities choked off. Every single manufacturer I have talked to, and that includes the world's five biggest, has privately expressed its concern with the problem and its commitment to do something about it.

[Another benefit is that] a significant segment, perhaps not a majority, of the large customers that I have talked to see something like the locking key as being potentially beneficial for a variety of reasons.

One is in providing a non-burdensome but more effective means of controlling and administering the use of personal computers and software within their own organizations. The second reason is security of data, which is a very pressing issue in the corporate environment. The Adapso standard itself doesn't provide that, but it has been very carefully designed to be extensible. For example, add-one or custom microprocessors that work on the bus could provide data encryption and authentication.

One of the virtues of the [Adapso] lock-and-key schemes vis-a-vis everything that we have today is that it allows a single user to use software on multiple machines and allows a single piece of software potentially to be shared on multiple machines.

> ***When I get up in the morning and I ask what we are doing, my first thought is not how we are going to beat the competition; my first thought is what are we going to do for our customers. . . . It is OK for [Atari's] Jack Tramiel to say that business is war, but I say business is making customers happy.***

What kinds of problems will AI-based software help to solve?

One problem is that the amount of overhead and of thinking you have to go through to get nicely formatted business correspondence is actually too much, in my opinion. It could be greatly simplified.

Another issue: the management of loose bits of information, such as your appointments, a list of things to do, the notes that one may make at a meeting or something about who said he would do what and when — there is no effective organizing tool for coordinating the stray bits of information. There are some individual products like appointment calendars, but those sort of take a piece out of this integral web. They're very partial solutions.

A third problem is when you have groups of people working on projects over an extended period of time and they build up a heterogenous set of documents. For instance, in developing a software project there are specifications, design papers, weekly progress reports, schedules, correspondence, marketing plans, test site reports, bug reports and other kinds of status reports. These documents are originated by many different people. There is no effective way of coordinating, integrating and querying a heterogenous set of documents on related issues.

The more we look into it, the more firmly we believe that there are these distinct but overlapping problems with management of fundamentally textual as opposed to numeric information and that one wants to apply personal computer technology to those problems.

What do you think of Steve Job's statement at a Microsoft press conference in May that "there's a war brewing between Lotus and Microsoft?"

I think wars are fought between armies of nations.

There is no question that in the applications arena, Microsoft attempts to compete with Lotus. That is intentional phrasing, because in the applications arena, Lotus is clearly in a market leadership position, and our goal is to stay that way.

We expect there will be ongoing competition from a variety of sources that potentially include Microsoft, Cullinet Software, IBM, two guys in a garage. Competition can come from other micro software companies, from start-ups, from multi-billion-dollar hardware companies. We simply can't afford to be complacent at all. It is really hard to say right now where the major threat is going to come from.

We have to maintain our own internal sense of balance and appropriateness. That means making good on the commitments we make to our customers, shipping the new products that are the ones that people want and logically continuing to build up our business.

When I get up in the morning and I ask what we are doing, my first thought is not how we are going to beat the competition; my first thought is what are we going to do for our customers. I know it sounds a bit like a homily, but it happens to be the way I think, and it's the way that Lotus thinks. It's a good corporate style. It is OK for [Atari's] Jack Tramiel to say that business is war, but I say business is making customers happy.

Is Lotus starting to move into systems software, for example in the Lotus/Intel expanded memory schemes?

In a strict sense, memory management being a function of the operating system, one could say the Lotus/Intel spec sort of crosses over into the operating systems arena. However, it is a major tactical move, not a strategic move, because it is intended to respond to a very particular set of customer needs, spreadsheet users who want to have more memory in their models. Because a more general solution was not forthcoming in the time frame the customers wanted it, we really felt it was incumbent to do something about it. The lack of generality of the spec is its strength, because it sends a very clear signal that it's for data, not for code. It really works well for spreadsheets but may not work for other things. It is also clean; it doesn't screw up the operating system. The nature of the specification itself says something about our intentions, which are not to go into the systems software business in a general fashion.

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IN DEPTH

Executive Interview

John Fralick
TRW, Inc.

By George Harrar
Features Director

John Fralick is manager of Technology Planning, Information Systems for TRW, Inc.'s corporate offices. TRW exceeded $6 billion in sales last year by providing products and services in three markets: electronics and space systems, automotive, and industrial and energy.

A few years back, TRW decided to build a new headquarters in Lyndhurst, Ohio. Fralick was assigned the job of figuring out what information systems should go into a building which management expects to occupy until the year 2035.

Fralick necessarily took a long view of how people will work in the computerized office. He had to plan for what he thought would happen as well as what might happen. He was interviewed a few weeks before TRW moved in June 1.

Management stipulated a life expectancy of 50 years for the new corporate headquarters. How do you begin to think of information systems anywhere near five decades out?

When they said the useful life of the building was to be 50 years, the first thing we tried to do was make an honest attempt to forecast where technology was going.

We tried to do the whole 50 years. You can make some assumptions, gross assumptions, on where technology is going for maybe 10 or 15 years. It's real hard to get to 15. We came to the conclusion quickly that it was silly to do it for 50 — absolutely silly. But we felt fairly confident we could make some pretty good projections on where technology would be 10 or 15 years from now. We felt we could make some very good projections on where it would be three to five years out.

You did this forecasting two years ago. How have your predictions held up so far?

I'd say for the short term we were right on. We hit the nail on the head as to what would be happening over the next three to five years. The things we said have actually come to pass — although not exactly when we said they'd come to pass.

There's a tendency to be overly optimistic about big developments. You think they're going to occur faster than they do. There's a tendency to miss the boat on some of the shorter term things. They don't come to pass quite as fast as we think they will.

On the other hand, some of the long-term things sneak up on you, things like fiber optics for communications and voice processing. They're probably going to come to pass before we thought they would.

I guess the important thing we got out of trying to forecast the technology wasn't a high level of confidence in the forecast as much as what we inferred from it and then used to design the building. We basically wound up concluding that we really can't estimate over 50 years what the technology is going to be like. Because we can't, we've got to build as much

"If you look at the amount of equipment going in, the building starts to look like a giant computer room."

flexibility into the building as possible to accommodate just about anything that would come down the road.

We took the technology forecast, talked about the generic styles of processing, talked about generic computer systems and what they might be like, talked in a general sense about what people might be using computers for and how much they'll be using them in their jobs. Then we tried to forecast the characteristics of the devices — again, in generic terms — and said, "Well, if that's what things are going to be like, how should we build the building to accommodate those kinds of devices?"

Some of the more important things that we decided on were how big the equipment is, how much is going to be in your office, what are you going to be doing with it, what are the wiring systems going to be like and will they change.

> ***We've tended to push more of the responsibility for computing out into the user areas rather than trying to operate a big, monolithic, controlled data center.***

It's an interesting situation, because you started planning two years ago, and you figured three to five years as the period when you thought you could make some pretty good guesses. You only have one more year before . . .

. . . before our good vision is up. Sure, we can see that. We selected a local-area network and a PBX for the building.

A single one for each?

Yes. And there have been an awful lot of new developments in the marketplace since then.

Which ones did you choose?

We chose the United Technologies Corp. 1001E PBX, a digital PBX, and we chose TRW's local-area network. Not a lot of people know about it, but TRW has been in the local-area networking business for a number of years. The primary customer has been the government, the defense agencies.

On Jan. 1, the division that manufactures the product went commercial with a charter to go after the commercial world — to provide a dual-cable, broadband coaxial, tree-structured bus topology local-area network. It does a very nice job of supporting personal computers and asynchronous devices. Because it's broadband, it does a fine job of supporting video; and because the topology's quite similar to that being used by Wang [Laboratories, Inc.], we are also going to be supporting most of the Wangnet services.

Your personal computers are what kind?

IBM Personal Computer XTs.

Any other vendors?

Not in the personal computer world. We set a policy that says that the IBM Personal Computer is the standard for corporate headquarters.

That was the standard even before deciding on the equipment for the new building?

Yes. Here's an example of how things have changed. When we chose the local-area network, we only had a couple of personal computers on the [corporate] staff. Now we've got about 60; we're moving into the building with about 75. The number has grown tremendously.

So we selected a local-area network. Now we have a new population of devices to support.

How many people will work in the new building?

About 450 will move in. The capacity is 750.

What are the basic functions of the people who work there?

We've got six functional departments — science and technology, communications, human relations, finance, law, planning and investment.

Let's go back to what people will be using computers for and the characteristics of the devices. What changes do you see in the styles of processing in 10 to 15 years? Are you talking about centralized vs. decentralized?

Yes. Five years ago, we were just starting in office automation. All of our applications were run on a centralized — essentially a single — mainframe computer.

Actually, about seven years ago, we started installing time-sharing systems, making computers and terminals more accessible to people for interactive processing, getting people to take the responsibility for initiating their own jobs rather than having them all processed by a large central batch processing facility. We were essentially trying to spread the responsibility for computing out to the user community. Also at that time, we were getting into office automation. We implemented shared logic, word processing clusters on a department-by-department basis.

So over the past seven years, we've tended to push more of the responsibility for computing out into the user areas rather than trying to operate a big, monolithic, controlled data center.

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It's interesting you need the words "push it out." It's not being pulled out?

Seven years ago, it was a push. Now it's a pull. I think the turning point was three years or so ago — then it was a tremendous pull from the users to take the responsibility for their systems and to get involved in the development process. Today, we have a lot of users who are doing their own applications development using some higher level language tools that we've made available to them.

What is the status of personal computing in the corporate headquarters?

At the secretarial levels, we've got word processing and some additional support tools. We tried to cover the needs of the manager and professional analyst, basically by providing personal computers. The big application there has been spreadsheets. Today, not many people have explored the other things you can do with personal computers. Once we're over the enthusiasm for spreadsheets, people will be looking for new things to do.

In terms of styles of processing, the way we see things going is that there will be intelligent personal workstations in almost everyone's office. They will be very much like today's personal computers but considerably more powerful. Those personal computers will be networked together through a local-area network, accessing a variety of shared resources, which may be allocated on a departmental basis or across the board for the staff to share.

The mainframe computer is still going to play a large role in our processing because we support a couple of key systems base that are supporting the management of the company as a whole. They're primarily involved in the collection and reporting and analysis of either financial or reporting information. So we're developing some large central systems, accessible to all the units and divisions of the company, that are repositories of financial or employee information. Then we're trying to provide analysis and modeling tools so people can access that data and work with it.

What do you see changing in how people use computers? Right now, your secretaries use word processors and your analysts primarily use spreadsheets.

There's more than just that. We have a number of people in the financial and planning areas doing financial modeling with tools like [Management Decision Systems, Inc.'s] Express and some large mainframe-based tools that can handle sizable problems and considerable amounts of data. Those are end-user tools. They are just like a spreadsheet in that the users develop their own applications and solve their own problems without a lot of support or direct involvement from the information systems group.

We've got data base tools that allow people to build their own applications and maintain personal data bases or data bases of departmental information to store, retrieve and report on the information that's of specific interest to their area of the company.

We've also got a range of traditional data processing applications, some of which have been developed as interactive applications for direct use by the end user and a few that are still operated in a traditional mode.

That's now. How about in 10 years? What do you see changing in how people see computers or what they use them for?

I think people are going to be more involved in developing their own applications. The tools that will be available will make it easier for end users to develop their own data bases — to store whatever information they're interested in working with in a data base. And then the tools will be available for them to analyze it and report on it in whatever form they need it.

Those things are becoming available now. They're not quite as easy to use as you'd like. The analysis tools that people really need don't usually work with the data bases that are available to store the information. So the whole process of end users maintaining their information and essentially being self-sufficient really isn't as easy as it needs to be before this thing becomes widespread.

I would say that in the future, people are going to be

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using the computer to develop their own applications in a higher level language or a very powerful analysis kind of tool. They can satisfy their own needs and be self-sufficient without having to have a lot of day-to-day support from the information systems group.

How about the opposite — linking up to the mainframe? Your analysts need that connection.

I think information systems is still going to wind up getting involved in the larger applications and the applications shared by departments or divisions across the company. Information systems will be involved from the point of view of developing and maintaining the data base structures that hold the information these people need. People have their own tools to get at the information and work with the information, but you're going to see information systems or a central group needing to coordinate the access to the shared data bases to maintain control, integrity of the data base and security.

You were talking about ways data would be input — by voice, for instance. What do you see changing in terms of characteristics of the devices?

What we were interested in figuring out was how big the devices would be, how many you would have, what the power requirements would be and what kind of load they would place on the heating and air-conditioning systems. If you look at the amount of equipment going in, the building starts to look like a giant computer room.

How much of an investment is the building?

About $60 million.

What part of that amount relates to information systems?

About four and a half million — if you talk about the new things we're putting in. It doesn't include the investment in what we're carrying over.

Do you see one terminal or personal computer per person?

Right now, about two out of every three people have a terminal or a device of some sort. Our goal, like everyone else's, is the elusive multifunction workstation. Yes, to the extent that we can find the multifunction workstation that meets most people's needs, I suspect it will be about one to one.

Are you committed to looking to IBM for that workstation?

Not at all. Right now, IBM seems to have the best product for the manager/professional-level individual.

That being the Personal Computer XT?

It's certainly not the best product from the hardware point of view. But from the software point of view, people are developing software for the IBM first. The amount of software that will be available and the speed with which it will be brought to market and the extent to which it will be supported — today that says IBM's probably the best bet in the personal computer world.

How about the Personal Computer AT?

> ***We made a decision that we're not going to have a large mainframe-style data center inside the new building. You know, the very expensive floor space is better off being used for people than it is for machines.***

We've gone through the progression of hardware upgrades. As IBM introduces a new device that's faster and has a larger storage capacity, we start buying the larger device for those of our users who need the extra horsepower or storage. So when the AT was announced, we changed our ordering from XTs to ATs, but we backed off because of the problems in delivery and the quality-control problems on the hard disk. We're still ordering XTs, and we haven't gotten any ATs in yet. We're waiting for those problems to go away.

You made the decision not to put the data center in the building. Where is it located?

We're actually a service bureau customer of one of our divisions. We made a decision that we're not going to have a large mainframe-style data center inside the new building. You know, the very expensive floor space is better off being used for people than it is for machines.

If we should decide we want to staff and maintain our own data center, there is a provision in the site plan to build a separate, modular, low-cost data center building on the campus of the new headquarters.

How is your data center today connected to the new building?

By T1 carrier — a multiplexed T1 link to connect the 3270 terminals in the building to the computer-aided design equipment from the building to the mainframe here. The distance is about eight miles.

Because we made the decision not to have a large mainframe-based

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data center in the building doesn't mean we don't have computers there. We recognized there's going to be a need for not only the mainframe but also distributed file servers, print servers, time-sharing systems and departmental CPUs that are shared by groups of users.

So we've done two things. One is the network control center, which essentially houses all the communications gear and communications monitoring equipment.

We also left room there for any CPUs or servers that are shared across the board by all the people on the staff. In fact, there's one room in each wing on each floor of the building. We set aside space for essentially departmental or distributed CPUs, so that if the communications department needed its own CPU or if it made sense to put a file server close to the printers in the communications area, we have space set aside.

The problem we have today is that if we wanted to wheel in a new device, we'd have to either stick it in the hallway or in the closet. So a lot of what we've done for the new building is really space planning — setting aside areas of the building to house the communications controllers, the servers, the distributed CPUs that we'll likely be using, even though we're not using a lot of them today.

Going to a new building gives you the opportunity to change strategies, change your wiring, change vendors, if you want. Did you reassess your commitments to various vendors and strategies? You don't have to tear into the walls to change your wiring. You're starting fresh. What different directions, if any, is TRW taking with the new building?

Two things — let's talk about communications, and let's talk about processing strategies. We made a decision fairly early in the new headquarters project that what we were going to do was build a good base of communications systems but not change our overall processing strategies drastically. One reason is the investment in existing systems, not only in terms of dollars for hardware and software but the amount of training that has gone on for the people who are using it.

We felt that the systems we're using today were serving us pretty well. We didn't see anything that much better on the marketplace, so there was no great motivation to change our applications or our processing hardware or our software strategies.

What we decided was that our basic processing strategies would evolve whether or not we were going to move to the new building. And that we'd handle it through just our normal strategic planning and capital acquisition process.

So we're not changing everybody's device; we're not changing CPU vendors; we're not changing applications systems at this point. And one of the advantages, we hope, is that the users will make the transition more easily from the old building to the new one.

There's nothing you felt you were doing wrong?

We had the opportunity to change things, but we didn't see anything that was so much better than what we had that there was any great motivation to change.

For word processing, you're using what system?

We're using Wang at the secretarial level and primarily [Multimate International Corp.'s] Multimate on the Personal Computers for those professionals who choose to do their own word processing.

Can the secretaries communicate with the Personal Computer users?

Yes. We're finishing up a little software right now that will make it even easier to do, so that documents can be transferred between the Wang and the Personal Computer.

You're customizing it yourself? Wang isn't helping you?

Multimate provides the conversion from Multimate to Wang. It does a pretty good job. What we're doing is essentially setting up the communications — some software to assist the communications process.

Will you have an information center on the premises?

Yes. The information center is going to be a place where people can get training. It's a place where people can get information on what's new, what's coming down the road, a place where people can try out hardware or software that they may not have used before.

We're going to be using it for one-on-one training and group training, for consulting on the use of personal computer tools. And we'll also use the space and equipment for people who may not have a dedicated device of their own. They can walk into the information center and get access to the device.

Predominantly in an IBM environment?

No. It's predominantly geared toward personal computing, which to me means something that the user does himself. If the personal computing application turns out to be a spreadsheet, it will run on an IBM Personal Computer. But if it turns out to be Wang word processing, it will run on a Wang.

We've got some data base tools that we class as personal computing tools that run on a Prime Computer, Inc. time-sharing system, and we're looking into more user-friendly interfaces to our large data base management systems. Those, to me, are personal computing tools.

When the information center first came out, people thought of it as the

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place to go talk to the data administrator to get information. And then the personal computer revolution took off, and people started incorporating personal computer support in that area. For us, it's not personal computer support and it's not data administration. It's helping in the use of personal computing tools, regardless of what vehicle delivers them.

To whom do you report?

To the director of company staff information systems. He reports to the director of science and technology.

For two years now, you've been involved in technology planning for the information systems that go into the new building.

Actually, for about three and a half. My normal job is technology assessment, technology evaluation and strategic planning for how TRW company staff can and will use information systems.

By company staff you mean the corporate staff?

Yes. I used to be the manager of the data center. There was a real emphasis here at TRW, starting a couple of years back, on doing some good strategic planning. Our department created a planning unit that could focus on strategic planning issues.

How will the corporate headquarters be linked to the other divisions of TRW around the country and the world?

Primarily through an IBM Systems Network Architecture network for the applications that are IBM-based. We also have some company-wide applications that run on Prime computers, and those applications are accessed through [GTE] Telenet. There is some direct-dial remote job entry back and forth. But in the future we will be depending more heavily on the IBM and the Telenet long-distance data networks.

What about electronic mail?

We have a companywide electronic mail system. There are about 3,000 active users worldwide. We're using GTE's Telemail system, which runs on Telenet. We've been into electronic mail for a little over two years now, and we've seen steady growth in the level of usage and the size of the user community. It's really caught on nicely.

Back to the building itself. You chose United Technologies, UTC, on your PBX vendor. So you decided to go with a separate digital PBX for voice and a single local-area network from TRW for the bulk of data.

Yes. One of the bigger decisions we had to make was: Do we have a PBX and a separate local-area network for data communications? Or were we going to try to get a PBX that did both voice and data? The problem is, state of the art is all relative — it's a point in time. There comes a point where you have to make a decision, and the state of the art moves on.

At the time that we had to make our decision, which was a little over a year and a half ago, we really didn't see any integrated voice/data PBXs that fully met our needs for data communications.

We also wanted to have video distribution throughout the building, and PBXs don't handle video. Now at the same time, we didn't find the local-area network that met all of our data communications requirements either. But we felt that we not only could do the best job of serving our current needs, but we'd also be building good basic capabilities for future expansion if we were to go with a PBX for voice and a local-area network for data — and video.

The basic decision was to buy a high-quality digital PBX. We chose of UTC. Of the ones we looked at, its cost per handset was extremely attractive. It was a very cost-effective voice switch, and it had some reasonable data capabilities, but it wouldn't be considered a heavyweight in the data world. And that was OK, because we wanted a good voice switch. We didn't need a heavy-duty data switch, because we're going to put most of that on a local-area network.

And then we looked at local-area networks. We really did survey the entire marketplace. We were under absolutely no constraint to pick an in-house product. We picked TRW's product essentially on the strength of its systems engineering skills. It had a competitive product — competitive in price and capabilities.

The requirement we had for data communications included supporting the Wang systems, both terminal-to-CPU and CPU-to-CPU; IBM 3270 terminal-to-CPU; a host of asynchronous computers and time-sharing systems and asynchronous terminals; as well as the growing population of personal computers, both used as terminals to access CPUs and to transfer files from one to the next.

What we tried to do was find a solution to all these data communications problems that would be as integrated as possible. What we found on the marketplace was that there wasn't much integration you could buy. Wang didn't talk to IBM, and the whole idea of the virtual terminal concept and interoperability of devices and things like that was still a gleam in everybody's eye.

So we were faced with a decision of either putting additional dedicated wiring to these systems or installing separate local-area networks for the systems — or trying to find a local-area network that could at least support, if not integrate, communications for a number of these different vendors. We didn't want to install multiple wiring systems if we didn't have to. What we wound up

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doing was choosing a broadband local-area networking approach, which said that we could run multiple logical local-area networks on a single cable plan.

So we've actually got a dual-cable local-area network, two cables running to essentially every office in the building. Because the broadband cable is divided into separate communications channels, we can run different local-area networks within the different channels of the cable.

We have one channel of information on a local-area network supporting the asynchronous devices — the VT100s that connect the time-sharing systems or electronic mail, the personal computers that are used as asynchronous terminals connected to host computers or time-sharing systems or the personal computers when they're transferring files between each other.

Within other channels on the cable, we're supporting parts of Wang's Wangnet local-area network, primarily the part that is used to connect Wang terminals to Wang CPUs. We also have reserved a number of channels that we can pipe traditional video signals over.

All these channels and all this information is available at every office in the building. If you moved into a new office, all you'd have to do is move your terminal and the device interface between your terminal and the local-area network. And since all those channels of information are coming into your office, there's no additional wiring that we'd have to run to attach you to the set of local-area network services that you need.

The problem is that the state of the art then, and still today, is these distinct logical local-area networks. There is an asynchronous local-area network, there is a Wang local-area network, and the two don't communicate with each other. The signals share the same physical piece of wire, but information doesn't move from one channel to the next.

So what we managed to achieve, really, is integrating a bunch of logical local-area networks onto a single physical cable plant. What we'd like to see is real integration — or at least good bridging — so that information can flow from one local-area network to the other.

If you were making the decision now and what you decided could be installed in this building today, would you make a different decision separating the PBX and local-area network?

Probably not. I've been wondering about this lately, because there have been some really neat announcements on PBXs lately.

What has caught your attention?

I'm not sure I want to mention brand names.

Our readers like to know.

Well, some of the things that we liked about Intecom's future plans have actually come to pass. Intecom had some attractive offerings when we looked at them, but they were all breadboards, prototypes, not something we could buy and install. Some of those things have actually come to pass. It's still an attractive product.

Northern Telecom has come out with some attractive data capabilities on its PBX, and some of AT&T's announcements in the local-area networking area look pretty good. The problem is, most of the stuff still can't be bought and installed today.

That's one of the big lessons we learned. You've got to be careful about selecting these systems, because if you read the trade publications or the vendor literature, you're led to believe that a lot of the stuff you want is available off-the-shelf, that it will plug in and work. When you really research it and get into these vendors and talk to the engineers, you find out that it's not quite ready yet.

Having watched the industry over the last few years, the stuff that was going to be six months away slipped to 12, maybe. So in a lot of ways, I don't think that much has changed in the market in the last couple of years in terms of solid, deliverable products that would change our decision to do anything much differently than what we did.

Two years ago I had a feeling, "I wish we could wait three years to make this decision, because there's going to be some really slick stuff available in the

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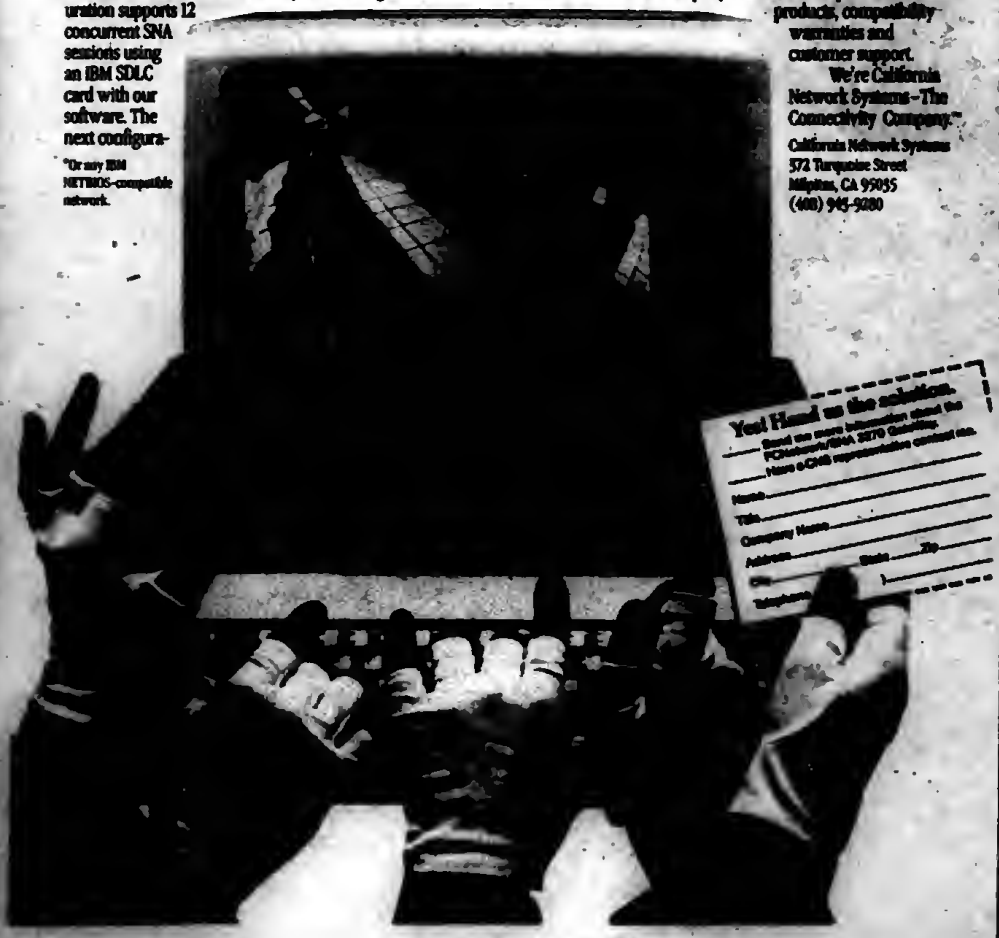

marketplace." You know, I still feel exactly the same way.

The other thing is that by taking the approach that we have — the fact that we have the broadband, dual-cable local-area network — we have maximum flexibility in the coaxial-based local-area networking world. We can run and support a variety of different styles of local-area networking devices on that cable plant.

We also have a good PBX and a good local-area networking ability. We have the best of both worlds, and now we have the option to add new services to whichever engine is most appropriate.

But you do have two worlds. You don't have the one integrated world.

We haven't integrated voice and data on the same set of wires; that's a fact. But what does voice and data integration mean? It means that voice and data are carried over the same pair of wires.

That's what the state of the art is today. The advantage is it saves you some cost, and it saves you some work in managing the wiring of the building. But voice and data still aren't really integrated as information media. They travel down the same set of wires.

Three years ago, when you were hoping or wishing that you could wait three years to make the decision, you may have been expecting a local-area network from IBM. Yet what they came out with was a cabling strategy.

And it's not even a completely defined cabling strategy. The specifications on the fiber-optic components of that are still not clear, and users' experiences in installing the IBM cable to date haven't been very good. We were very aware of IBM and what they were doing at the time we made our decision. We obviously couldn't wait for IBM to go public and disclose. We couldn't buy the product, because it wasn't available. We had to make a decision to go ahead without IBM.

Was that a painful decision?

No, it wasn't. We felt comfortable about the decision then, and at times I think it has turned out to be a pretty wise one. What have you seen? In the meantime, they have introduced a completely different networking scheme, and the token ring and its associated wiring scheme still isn't something with which you can do very much.

One of the real features of the building from an information systems point of view is the raised floor throughout the office areas. We talked about flexibility, we talked about wiring strategies and local-area networking strategies. We realized that over 50 years, the only thing we can be certain about is that things are going to change. We're probably going to want to install a new wiring system. We may want to install new physical local-area networks. We're certainly going to want to install new logical local-area networks.

The medium that we choose to use may change from coax to twisted pair or fiber optics. Knowing that, what we wanted to do was make sure the building was built in a way that wouldn't preclude us from taking advantage of these new things as they became available.

So we have installed a raised floor throughout all of the office areas, with a 6½-in. clear space underneath, so that not only is it going to be easier to make changes, but also, in the event that we decide to go a whole different route with local-area networking or take advantage of some new technology, we can install it in the building without any major disruption to the end users or any major cost for construction. And we can do it quickly.

So you don't feel locked out at all? You're still looking at Intecom and Northern Telecom and the AT&T in terms of PBXs and local-area networks?

We're not looking at them, no. We're actually looking at the useful life of this PBX to be in the neighborhood of five or seven years. We expect to have an opportunity to revisit our decision in the not-too-distant future.

What do you know already that you did wrong or did right with this new building?

In terms of assessing and forecasting the technology, I'd say that things that seemed like they were a long way off and vague often surprise you and happen sooner. On the other hand, things that you thought you knew pretty well, things that seemed like they would come to pass relatively quickly, sometimes surprise you by taking much longer.

In general, I'd say that people who are in the position of trying to assess technology or select equipment should do so with a healthy dose of skepticism and inquisitiveness. We found an awful lot of things that we thought we could buy off the shelf, but really, when we dug into it, we found that they were still on the drawing boards.

Did you follow a conservative approach then? Did you end up with a conservative building?

No, our approach to the applications and the things that people are doing today with computers is evolutionary — a little conservative, yes, but evolutionary, not revolutionary. With respect to the new communications systems, we're installing things that are pretty close to the state of the art as to what's deliverable off the shelf.

What we're installing is practical, but because these are still relatively new systems, there's an element of risk.

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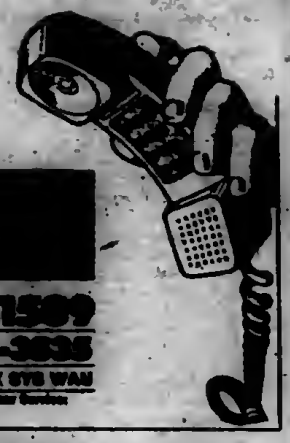

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IBM-compatible unit boasts plasma display

The IBM-compatible Exec-Partner

SECAUCUS, N.J. — Panasonic Industrial Co. has introduced the Exec-Partner, a $2,595 portable personal computer that features a gas plasma display and is said to be compatible with the IBM Personal Computer.

The Exec-Partner reportedly includes a 25-line by 80-col. orange gas plasma display that is flicker-free and offers faster refresh times and a longer lifespan than the LCD screens built into most laptop portables. The display also is brighter than the electroluminescent displays used in some more expensive laptop computers.

The Exec-Partner is 21 in. long, 16 in. wide and 5 in. tall and weighs 20 pounds.

The unit includes 256K bytes of internal memory and is based on the Intel Corp. 8086-2 microprocessor, the vendor said.

It is said to feature a built-in thermal printer offering correspondence and draft-quality output at 60 and 20 char./sec., respectively. Correspondence-quality printing, on regular paper, can be achieved through use of a ribbon cartridge, which is included, the vendor said.

The Exec-Partner's keyboard is said to be configured like that of the Personal Computer's and have 10 function keys. Four of the keyboard's special function keys are equipped with indicator lights.

Also included are twin 5¼-in., 360K-byte diskette drives, Microsoft Corp.'s MS-DOS operating system and GW Basic language and both serial and parallel ports.

The Exec-Partner will be available this month, the vendor said.

Panasonic Industrial is located at One Panasonic Way, Secaucus, N.J. 07094.

Word for Macintosh enhanced

BELLEVUE, Wash. — Microsoft Corp. has introduced an upgraded version of Microsoft Word for Apple Computer, Inc.'s Macintosh that improves performance with the Apple Laserwriter printer and permits users to convert Word files on the IBM Personal Computer to Word files on the Macintosh Word or vice versa, while retaining all formatting.

Microsoft Word for the Macintosh Version 1.05, priced at $195, reportedly increases Laserwriter output speed up to 400%, gives improved word and character spacing and supports manual feed and a print-cancel function.

Among other enhancements, a modified date and time stamp in the Get Info box reflects creation and modification dates; documents are returned to folders; character formats can be turned off from the keyboard and text; and formats can be moved across a horizontal window split.

An update kit with master and backup program disks and added documentation is available at no cost to customers who bought the software after April 1. Customers who bought the software before that date but paid $10 for a backup disk also are entitled to a free upgrade. Other customers with existing copies of Word for the Macintosh can buy the kit for $15.

More information is available from Microsoft through Box 97200, 10700 Northup Way, Bellevue, Wash. 98009.

SMALL TALK
Edward Warner
CW Senior Editor

IBM's variety swamps users

Maybe IBM should consider using family planning for its ever-growing line of Personal Computer models.

As things stand now, at least 15 different models of the Personal Computer exist. And while IBM may find this beneficial in some way, users are being left in a state of confusion.

Should they buy a Personal Computer AT or a Personal Computer AT 3270 Model G or go all the way for the AT 3270 Model GX? Or should they choose the Personal Computer XT or AT versions of the Desktop Series 1?

Such diversity is the mother of confusion, and that is just what befalls potential Personal Computer users in any corporation when they try to decide which Personal Computer is best for their needs.

According to Home Insurance Co.'s Vice-President of Information Systems Anthony Graffeo, "The choices and the products [from IBM] have confused a lot of people — the 3270 [Personal Computer], the Series 1 [Personal Computer] — there is much too much."

With so many different models of the Personal Computer to choose from, he observed, potential buyers are moving slowly through the selection process. This, he added, may be one reason why demand has "dried up" for the Personal Computer in corporations; the potential users are waiting until a machine comes out tailored specifically to their needs.

IBM has certainly tried to meet these needs in every variation. Consider this incomplete list of Personal Computer models: the Personal Computer; the Personal Computer XT; the Portable Personal Computer; the Personal Com-

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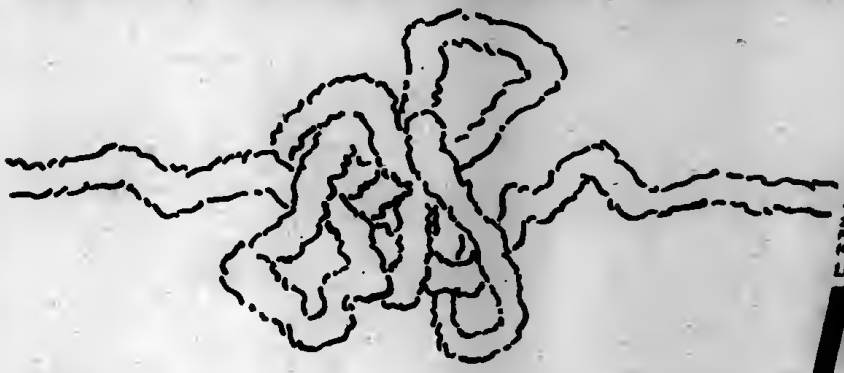
We Took The Kinks Out Of IBM Cabling



Fact is, IBM's Token Ring baseband cabling system for local area networks is a terrific plan. But that's all it is right now. You're going to have to wait quite a while to connect your equipment to IBM cabling.

Unless you connect with NESTAR. We're the only ones now making IBM's local area network cabling actually work. Because we're totally compatible with their system. So you can get all the benefits IBM promises tomorrow from NESTAR today.

All of which isn't surprising. NESTAR has installed more large local area networks in large institutions in the last five years than any other vendor.

So if you want to make the right connections today for IBM cabling, you don't have to wait for IBM. Call or write NESTAR today; we can deliver as soon as tomorrow.

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(415) 493-2223

Local Area Networks For Large Organizations

NESTAR

Chart-Master, Sign-Master upgrades out

Graphics tools run on IBM micro line

WESTPORT, Conn. — Decision Resources, Inc. has announced enhancements of its Chart-Master and Sign-Master business graphics software for the IBM Personal Computer line.

Sign-Master 5.1, for use in creating signs and textual slides, reportedly offers type fonts called Swiss and Swiss Bold that are similar to the Helvetica type fonts.

It also is said to offer a Symbol font that contains 94 symbols or icons for such items as arrows, geometric shapes, people and transportation vehicles.

A scroll-through menu is said to guide the user through the step-by-step production of word charts such as outlines, tables, financial summaries and the like.

Chart-Master 6.1 offers a feature called Datagrabber, which reportedly gives access to spreadsheets such as Lotus Development Corp.'s 1-2-3. Chart-Master also incorporates both the Swiss type fonts and the Symbol font; symbols from the latter can be inserted into a chart or a graph, the vendor said.

Chart-Master's standard features are said to include context-sensitive Help screens. The software also includes 40 customizing options, including hatch and line patterns, exploding pies, text fonts, colors, axis control, floating legends and others.

It supports more than 80 devices, including the Hewlett-Packard Co. Laser Jet printer, the IBM Color Jetprinter and Proprinter and the IBM Enhanced and Professional Graphics displays.

The enhanced versions of both products are said to support the IBM PC Network.

Sign-Master is priced at $245. Updates for existing users cost $65. Chart-Master is priced at $375. Updates for current users are $75.

Decision Resources is located at 26 Sylvan Road S., Westport, Conn. 06880.

Epson adds printers to FX series

TORRANCE, Calif. — Epson America, Inc. has announced two dot matrix printers in its FX series.

The 80-col. FX-85 and wide-carriage 136-col. FX-185 are both said to offer high-speed printing and high-resolution, near-letter-quality copy, single-strike-selectable print modes and built-in IBM character sets. Both include an 8K-byte print buffer.

Both printers reportedly operate at 160 char./sec. in draft mode and 32 char./sec. in near-letter-quality mode. The IBM character sets are said to allow both machines to emulate either Epson or IBM 5152 graphics printer control codes and to operate with software configured for the IBM Personal Computer, Personal Computer XT or AT.

The FX-85 and FX-185 include logic-seeking bidirectional printing, 96 Ascii and 11 international character sets, proportional-space printing, horizontal and vertical tabulation and short paper tear-off. The near-letter-quality mode offers the choice of pica, superscript or subscript and expanded pica character sets, while the draft mode allows users to choose pica, elite or characters formatted on the computer and downloaded into the printer memory, the vendor said.

The cost of the FX-85 is $490; the FX-185 is priced at $690.

Epson America is located at 2780 Lomita Blvd., Torrance, Calif. 90505.

Apple continues to post healthy Macintosh sales

SAN FRANCISCO — While Apple Computer, Inc. is having its troubles this year, the Macintosh personal computer is selling at the substantial rate of 25,000 to 30,000 per month, Future Computing, Inc. Chairman Egil Juliussen estimated late last month at the Macforum conference here.

The Dallas-based market research firm predicted that 350,000 Macintoshes will be sold this year in the U.S. and 90,000 will be sold overseas.

Roughly two-thirds of the Macintoshes sold through computer specialty stores are 512K-byte models, Juliussen said.

About 275,000 Macintoshes were sold in 1984, compared with 90,000 IBM Personal Computers purchased in that machine's first year, according to Future Computing figures.

"The computer is getting sarcastic. Listen to this: 'Here is the information you requested, O master.' "

In August, 128,000 MIS/DP executives can stop saying *"What we have here is a failure to communicate."*

There's a world full of computers out there. And everyone's trying to make them talk to each other.

The trouble is, there are so many technologies, so many products, so many promises, MIS/DP management isn't sure which way to turn.

In the August 26th issue of *Computerworld Focus* on Networks, we'll help them cut through all the smoke with a complete issue devoted to the topic of networking. Which gives you an ideal advertising forum if you've got a relevant product, service or strategy. Because you'll be surrounded by truly topical, informative editorial.

We'll take a look at LANs, PBXs and long-haul satellite technologies, as well as packet networks and teleconferencing. We'll call on experienced users to give us accounts of their own trials-by-fire. We'll ask industry experts to evaluate future directions and advise on the paths that are most likely to be successful for users. And we'll evaluate the products and strategies designed to link desks and offices and buildings and cities into a single integrated system.

So if you want to reach Computerworld's 128,000 paid subscribers, plus bonus distribution at important Fall '85 trade shows, the answer is simple. Get your ads in focus. *Computerworld Focus.* The August 26th issue. But hurry, closing is July 19th.

For more information, contact Ed Marecki, Vice President of Sales, *Computerworld Focus,* 375 Cochituate Rd., Framingham, MA 01701. Or call (617) 879-0700.

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underwhelmed

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Sun workstations: open architecture, open network, open options.

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Sun's entire family of workstations is built around the same powerful "standard" features, including: A Motorola 68010 microprocessor. Ethernet 10 megabit/sec. local area network (LAN). An advanced UNIX™ operating system, supporting up to 16 megabytes of virtual memory space per process. 9-slot Multibus® (IEEE-796) or 15-slot VME cardcages. High resolution, 1152 x 900 pixels, display and 66Hz non-interlaced refresh. Two RS-423 serial ports with full modem control. Mouse pointing device. Latest Sun software release including: SunWindows™, SunCore™ graphics library, Sun Network File System, C/Fortran/Pascal compilers, a 68010 assembler. And more.

Sun keeps your options open by allowing you to configure your workstations with or without disk, as standalone units, nodes in a network, or as fileservers. Sun Workstation® options include: Main memory expansion of up to 8 megabytes. Up to 380 megabytes (formatted) disk subsystem. ¼" cartridge tape and ½" tape drive subsystems.

The open attitude built into every Sun workstation begins with an advanced version of the industry-standard UNIX operating system, supporting fast I/O to disk, multi-processing and diskless workstation operations. Fast hardware combines with the power of more than 220 UNIX utilities, plus additional tools, to create the most productive computing environment available today.

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Lack of access to files stored throughout a heterogeneous network has always been the weak link in the team engineering chain. Until now.

Sun's Network File System (NFS) opens the lines of communication between multi-vendor computers, giving each user a window into a transparent information network. Via this network, large teams of professionals can cooperate on project work, accessing any specialized computing resources they need.

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Open architecture means open options. Sun workstations give you a long list of powerful standard features and options, built around proven industry standards. *Plus*, the benefits of the open market: an abundance of third-party companies working to open new doors for you and your company.

To find out more about Sun's open attitude and the workstations that have evolved from it, write: Sun Microsystems, Inc., 2550 Garcia Avenue, Mountain View, CA 94043. Or, simply call (800) 821-4643. In California (800) 821-4642. Our lines are open.

Open Systems for Open Minds.

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Sorcim enhances management package

SAN JOSE, Calif. — Sorcim/IUS Micro Software, a division of Computer Associates International, Inc., has enhanced its Superproject project management software for the IBM Personal Computer line. Sorcim/IUS has also announced a new corporate licensing program that offers users quantity purchases, unlimited licenses and service support.

Superproject 1.1 reportedly includes a printing program called Sideways, from Funk Software, Inc. Sideways permits a report to be printed horizontally, eliminating the need to cut and paste.

Other printing enhancements are said to include the ability to send spreadsheet-style columnar reports directly to a printer or disk file, as well as to a Sorcim/IUS Supercalc data file. Also reportedly included is support for the Intel Corp. 8087 math coprocessor and output devices such as the IBM Proprinter and Color Jetprinter.

Superproject runs under IBM's PC-DOS 2 or higher and requires 256K bytes of memory, the vendor said. The package costs $395.

Software available under the new corporate licensing program includes Sorcim/IUS's Superproject, Supercalc series and Superwriter and Easywriter series. The minimum license quantity is 25 copies.

Prices for Superproject, Supercalc 3, Release 2 and Easywriter II range from $5,925 for 25 copies to $65,000 for an unlimited license. The cost of a license for Superwriter or Supercalc 2 ranges from $4,425 for 25 copies to $48,500 for an unlimited number of copies.

The corresponding price range for Easywriter I, Supercalc or Supercalc 3 is between $2,925 and $32,000.

Support material prices include $150 per hour plus expenses for applications development, $75 per hour plus expenses for user seminars and training, $25 per set of documentation materials and $1.50 for each 10-min user guide.

More information is available from Sorcim/IUS at 2195 Fortune Drive, San Jose, Calif. 95131.

See what EnerConnect can do with mainframe graphics on your PC.

EnerConnect™ is the first software package that puts mainframe graphics capability into the hands of anyone with an IBM PC/XT/AT or 3270 PC.

Now a PC user can have desktop access to business and technical graphics applications generated by GDDM, ISSCO's Tell-A-Graf® and DISSPLA® SAS/GRAPH® and IGES datafiles.

Once they're displayed, EnerConnect lets you manipulate them in a variety of ways. You can rotate, enlarge, reduce, cut-and-paste with other elements from different mainframe files, add text and even direct output on low-cost PC printers and plotters. All without using expensive mainframe connect and processing time.

You can also use our PC-based graphics program, EnerGraphics, to interface with spreadsheet data from LOTUS 1-2-3, VISICALC and other packages, turn the data into easy-to-understand bar charts and then combine them with mainframe graphics.

EnerConnect. Your Mainframe-to-PC software link. Developed by the specialists in graphics applications software.

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SOFTWARE

■ Hart Scientific, Inc. has announced data analysis and report generation software for the IBM Personal Computer, Personal Computer XT and Personal Computer AT.

Q.E.D. reportedly allows users to acquire, graph, mathematically manipulate and store data for report generation. Users may create an unlimited number of windows for multiple data traces or display an individual data trace in multiple windows.

The product is said to allow data collection from multiple channels and data transmission to a variety of destinations. Functions such as mathematical analysis, tracing and archiving can be performed simultaneously. Q.E.D. is file compatible with software products including Lotus Development Corp.'s 1-2-3.

Q.E.D. resides in a minimum of 256K bytes of memory on the micro and can be used with the Intel Corp. 8087, 80187 and 80387 math coprocessors for high-speed analysis.

The cost of Q.E.D. software is $849.

Hart Scientific, 177 W. 300 South, Provo, Utah 84601.

■ Viewlogic Systems, Inc. has announced three computer-aided engineering (CAE) software programs for the IBM Personal Computer XT and AT.

The Workview series reportedly allows electronic design engineers to design and generate documentation on the micro and communicate with other micros, CAE/computer-aided design workstations, superminis and mainframes. Each program requires a minimum of 512K bytes of random-access memory and the IBM PC-DOS operating system.

Workview 100, the entry-level software series, includes schematic entry and waveform processing. Prices range from $3,500 to $5,500, the vendor said.

Workview 300 is a digital design system that includes all Workview 100 features as well as an interactive logic simulator. Prices range from $6,500 to $8,500.

Workview 500 is an analog design system that includes the above features plus a circuit simulator and simulator library for discrete components. The price of Workview 500 ranges from $5,500 to $6,500.

Viewlogic Systems, 33 Boston Post Road W., Marlboro, Mass. 01752.

■ Data General Corp. has announced the availability of the Microsoft Corp. GW Basic Compiler for the DG/One portable computer.

The compiler reportedly translates programs written in GW Basic into machine language. The software is compatible with Basic A, the standard Basic used on the IBM Personal Computer, to allow Basic A programs to be compiled and run on the DG/One.

The product reportedly gives DG/One users greater graphics software development capability as well as faster operation of long programs. The compiler requires a DG/One with a minimum of 256K bytes of memory and one diskette drive.

Cost of the compiler is $395.

DG, 4400 Computer Drive, Westboro, Mass. 01580.

MICROCOMPUTERS

■ R Systems, Inc. has announced a version of its integrated office automation software for the AT&T Unix Personal Computer Model 7300.

R Office reportedly integrates word processing, desktop management, data base management, table spreadsheet and report generation programs. The product can run on a single machine or on several micros operating on a network with the AT&T Unix System V operating system.

R Office requires a minimum of 320K bytes of memory, plus an additional 32K bytes for each additional micro in a network.

The price of the Unix version of R Office is $1,295.

R Systems, 11450 Pagemill Road, Dallas, Texas 75243.

■ Digital Equipment Corp. has announced a software package that allows a second terminal to be attached to DEC Professional series workstations.

The Pro/Associate package is reportedly invoked by the main terminal of a DEC Professional 350 or 380 system, which sends a Pro/Associate menu to the screen of the second terminal.

As the software runs on the associate terminal, the main terminal user may use the same or other Professional software programs simultaneously, according to the vendor.

Programs in the package are said to include Pro/Datatrieve data base management; communications software supporting Pro/Decnet and Pro/Communications; a login/logout facility; and file, disk/diskette and print services.

Pro/Associate runs under Version 2 of the DEC P/OS operating system. Hardware system requirements are a Professional 350 or 380 with 10Mbyte hard disk and a VT200 series terminal.

Cost of the software is $400, the vendor said.

DEC, Maynard, Mass. 01754.

■ McDonnell Douglas Professional Services Co. has announced the first of a series of systems development software products for the IBM Personal Computer XT and Personal Computer AT.

Prokit Analyst is reportedly designed to help systems analysts prepare data flow diagrams while simultaneously creating the supporting documentation as a data dictionary. Analysts may draw and edit data flow diagrams while the system produces and updates an applications dictionary.

The product includes the functions of McDonnell Douglas DFDdraw data flow diagramming software for the IBM Personal Computer, according to the vendor.

Additional functions include full-integrity checking, a process that enforces standard data flow rules on the user's creation and updating of data flow diagrams, the vendor said.

Prokit Analyst requires the Personal Computer XT or AT with a minimum of 512K bytes of memory and a color graphics board and monitor.

Prokit Analyst will be available in August for $2,450, according to the vendor.

McDonnell Douglas Professional Services, St. Louis, Mo. 63166.

■ Control-C Software, Inc. has announced an enhanced version of its Starjet software that reportedly offers improved capabilities in printing Micropro International Corp. Wordstar files with the Hewlett-Packard Co. Laserjet printer.

Starjet Version 3 prints multiple columns of text per page with one command, right-justifies text in both proportional and fixed-pitch fonts and redirects formatted output of a Starjet file to a disk file, according to the vendor.

Other enhancements include global font assignment, microjustification of intercharacter spaces, typographic effects, proportional fonts and support of seven font cartridges and 21 symbol sets.

Starjet 2 resides in less than 45K bytes of memory and is available in versions for IBM PC-DOS 1.1, 2.1 and 3; Microsoft Corp. MS-DOS; and Digital Research, Inc. Concurrent CP/M 86, CP/M 86, MP/M 86, CP/M 80 and MP/M II.

The cost of Starjet Version 3 is $150. Upgrade cost for current Starjet users is $25.

Control-C Software, 6441 S.W. Canyon Court, Portland, Ore. 97221.

■ Cosmos, Inc. has announced a network version of its Revelation data base system and has upgraded its single-user package.

Network Revelation reportedly is compatible with IBM's PC Network, Nestar Systems, Inc.'s Plan 2000 and networks running under Novell, Inc.'s Netware. The network data base system locks data at the record level, allowing several stations on the network to share files simultaneously but allowing only one user at a time to update records.

Release G of single-user Revelation is said to include context-sensitive Help screens, menu-driven data input and a file structure called Link that speeds sorting of files larger than 200K bytes.

Object code generated with Release G is not compatible with earlier versions. Code generated with earlier versions is compatible with the release but will run more efficiently if recompiled, the spokesman added.

Revelation runs on most Microsoft Corp. MS-DOS and IBM PC-DOS systems.

Network Revelation prices start at $1,495 for a four-user system. Single-user Revelation Release G costs $950, the vendor said.

Cosmos, Suite 102, 19530 Pacific Highway S., Seattle, Wash. 98188.

You can reach over 50,000 computer professionals in Norway.

Advertise in CW Communications' Norwegian publications and sell your products directly to Norway's thriving computer market. According to International Data Corporation (IDC), the world's leading information industry research firm, Norway's total DP expenditures for 1983 were $1.6 billion. IDC forecasts that DP expenditures will reach $3 billion by 1989. The personal computer market is also a lucrative one with expenditures in 1983 of $58 million.

CW Communications has two publications covering the Norwegian market; *Computerworld Norge* and *PC Mikrodata*.

Twice a month, 20,000 MIS/DP executives read *Computerworld Norge*. Modeled after *Computerworld*, its sister publication in the United States, *Computerworld Norge* is written for the professional end-user and reports on the most timely news concerning new products, new software applications and market trends and opportunities.

And every month, 30,000 professional and home PC users read *PC Mikrodata*. The editorial focuses on a wide range of topics including the latest information on the PC market, new software, hardware, interviews, buyer's guides and instructions for the PC.

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MICROCOMPUTERS

SYSTEMS

■ **Tektronix, Inc.'s CAE Systems Division has announced a computer-aided engineering (CAE) workstation based on the IBM Personal Computer AT.**

The Tekstation AT is said to provide a complete stand-alone engineering design environment on the desktop. The system utilizes a National Semiconductor Corp. 32016 32-bit coprocessor, the University of California at Berkeley Unix 4.2 operating system and CAE Systems, Inc. CAE 2000 design software.

The system reportedly supports design tasks through the 32-bit Unix environment, while standard tasks such as word processing and project planning are performed in the Personal Computer AT's IBM PC-DOS operating environment. The system provides up to 16M bytes of virtual memory and up to 280M bytes of local disk storage.

The IBM-based workstation is compatible with other Tektronix and CAE Systems products based on Apollo Computer, Inc., Digital Equipment Corp. and Sun Microsystems, Inc. terminals. The Tekstation AT can act as a multiple-user system networked through Ethernet.

Tekstation AT prices start at $25,000. The cost of an Ethernet interface is $1,400, and a file server configuration costs $40,000.

Tektronix CAE Systems Division, 1333 Bordeaux Drive, Sunnyvale, Calif. 94089.

■ **Spectravideo, Inc. has announced two portable computers and two IBM-compatible desktop micros.**

The Bondwell 2 laptop machine is said to be a battery-rechargeable, 11-lb portable based on the Digital Research, Inc. CP/M operating system. The system includes an internal 3½-in., 360K-byte floppy disk drive; a 25-line by 80-col. LCD with 640-pixel by 200-pixel resolution; 64K-byte random access memory (RAM); and eight programmable function keys. It is bundled with six software programs from Micropro International Corp. The Bondwell 2 costs $999.

The Bondwell 16 transportable is said to include 128K bytes of RAM, a Winchester 10M-byte hard disk drive, a 5¼-in., 360K-byte floppy drive, an internal 300 bit/sec. modem and a built-in voice synthesizer. It is bundled with five Micropro business software programs for $2,195.

The Bondwell 34 reportedly is a 16-bit, Microsoft Corp. MS-DOS-based desktop micro. It features expandable 256K-byte RAM, two double-sided 5¼-in. floppy drives, a monochrome 80-col. monitor interface and a Centronics Data Computer Corp.-compatible printer interface. It costs $1,795.

The Bondwell 36 is a hard-disk version of the Bondwell 34, featuring an internal 10M-byte Winchester disk drive and 5¼-in. floppy drive. It costs $2,995.

Spectravideo, No. 10, 3300 Seldon Court, Fremont, Calif. 94539

COMMUNICATIONS

■ **Multi-Tech Systems, Inc. has announced an autodial/autoanswer internal modem card for the IBM Personal Computer line, including the Personal Computer AT and Personal Computer 3270.**

The Multimodem 224PC is said to support communications at 2,400, 1,200 or 300 bit/sec. It is reportedly compatible with the Hayes Microcomputer Products, Inc. Smartmodem 1200/1200B.

The Multimodem 224PC can automatically switch among its three speeds for incoming and outgoing calls, according to the vendor.

The price of the modem includes Multicom PC communications software that reportedly features automatic logon and upload/download, test diagnostics and error-protecting file transfer protocols.

The Multimodem 224PC package is priced at $795.

Multi-Tech Systems, 82 Second Ave. S.E., New Brighton, Minn. 55112.

■ **Fox Research, Inc. has announced enhancements to its 10-Net 3270 Systems Network Architecture (SNA) gateway for its Fox 10-Net local-area network system.**

The Fox 10-Net SNA Gateway now provides one to four simultaneous active SNA sessions from each 10-Net local-area network personal computer with the host IBM mainframe. Previously, only one active session was possible at each networked micro.

The enhanced version also features a hot key for keying between IBM's PC-DOS and any active SNA session, the vendor said.

The code size of the gateway software has been reduced so that the 16 logical unit version will run on any IBM Personal Computer or compatible with 256K bytes of random-access memory.

The Fox 10-Net SNA Gateway, including circuit board, software and documentation, costs $1,800 for eight logical units and $2,900 for 16 logical units.

Fox Research, 7005 Corporate Way, Dayton, Ohio 45459.

■ **Digisoft Computers, Inc. has introduced its Mail-Com software for electronic mail communications over the MCI Communications Corp. MCI Mail service using the IBM Personal Computer.**

Mail-Com is said to offer users the ability to prepare letters before connecting to MCI Mail and then, by pressing one button, to send, process, receive and file messages automatically.

The package simulates a desktop environment and enables users to organize and use electronic mail in a

Discover the most powerful

The IBM Personal Computer AT.

Hold on to your hat.

The IBM Personal Computer AT (for Advanced Technology) is based on the advanced 80286 16-bit microprocessor. This remarkable computer will run many of the programs written for the IBM PC, up to three times faster. You'll be able to recalculate large spreadsheets in seconds and retrieve files in a flash. And it's ideal for IBM TopView, the new kind of software program that lets you run and "window" several other programs at once.

The IBM Personal Computer AT has got the power (and price) to surprise you. In many ways.

Compatibility, expandability, networking too.

With the IBM Disk Operating System, the IBM Personal Computer AT can use many programs from the fastest-growing library in the personal computer software industry.

The IBM Personal Computer AT is also available with up to 3 million bytes of user memory to run multiuser, multitasking operating systems such as XENIX™. Volume upon volume of information is available at your fingertips. You can customize your system to store up to 20,000 pages of information at one time. And its keyboard helps you use all of this computing power more easily.

This member of the IBM PC Family is a powerful stand-alone computer that can also be both the primary file server and a station on your network. With the IBM PC Network (which is so easy to connect you can do it yourself), the IBM Personal Computer AT can share information with IBM PCs, PC/XTs and IBM *Portable* PCs.

IBM Personal Computer AT Specifications

User Memory	**Diagnostics**
256KB-3MB*	Power-on self-testing*
Microprocessor	Parity checking*
16/24-bit 80286*	CMOS configuration table with battery backup*
Real and protected modes*	**Languages**
Auxiliary Memory	BASIC, Pascal, FORTRAN, APL, Macro Assembler, COBOL
1.2MB and 360KB diskette drives*	**Printers**
20MB fixed disk drive*	Supports attachment of serial and parallel devices
41.2MB maximum auxiliary memory*	**Permanent Memory**
Keyboard	(ROM) 64KB
Enlarged enter and shift keys	Clock/calendar with battery*
84 keys	**Color/Graphics**
10-foot cord*	Text Mode
Caps lock, num lock and scroll lock indicators	Graphics Mode
Display Screen	**Communications**
IBM Monochrome and Color Displays	RS-232-C interface
Operating Systems	**Networking**
DOS 3.0, XENIX,* PC/IX 1.1	High-performance, high-capacity station on the IBM PC Network*

*Advanced Features for Personal Computers

Get a hands-on, hats-off demonstration.

The IBM Personal Computer AT has the power, compatibility and expandability many PC users need, at a very appealing price.

For more information contact your authorized IBM PC dealer, IBM Product Center or IBM marketing representative. For a store near you call 1-800-447-4700. In Alaska or Hawaii call 1-800-447-0890.

IBM

MICROCOMPUTERS

manner similar to conventional mail communications. Mail-Com frees users from needing to wait for MCI Mail prompts or the need to remember MCI Mail commands.

The software reportedly permits users to send any type of information, including computer programs, Lotus Development Corp. 1-2-3 worksheets and binary files.

Mail-Com is priced at $139.95 and requires a minimum of 192K bytes of internal memory.

Digisoft Computers, 1501 Third Ave., New York, N.Y. 10028.

■ U.S. Digital Corp. has announced a communications program that runs on an IBM Personal Computer with 256K bytes of random-access memory and IBM's PC-DOS operating system.

Copylink-Plus features 32 user-definable function keys, 11 programmable automatic logon sequences and support for conditional programming of complex logon sequences.

Selected buffer read and write commands enable data to be received, processed and retransmitted. The package supports intercharacter delay, echo delay, programmable end of line, remote buffer control, true key breaking and automatic disk handling.

Copylink-Plus costs $129.95.

U.S. Digital, 5687-H S.E. International Way, Portland, Ore. 97222.

■ Communications Resources has announced a communications link that allows IBM Personal Computers and compatible machines to emulate Honeywell, Inc. VIP 7200 or VIP 7300 standard terminals.

Asynchronous Communications Emulations (ACE) is an integrated family of products that contains a set of menu options for terminal setup. Menus can be saved from session to session, the vendor said.

ACE uses a common keyboard arrangement and includes a Help facility. The product includes a file transmission facility for Honeywell's Geos 6 Mod 400 systems. The facility transmits either Ascii or binary data files and supports all common fixed-length or variable-length sequential data structures. It accommodates records up to 1K bytes and uses a protocol handler to eliminate transmission errors.

Features also allow the user to interact with the personal computer while on line to the Honeywell systems. With ACE, users can transmit data from a personal computer file and capture data in the microcomputer file while it is being displayed or after the screen has been filled. ACE also can rename or delete personal computer files or list personal computer file names, the vendor said.

An IBM Personal Computer or compatible with one disk drive, 128K-byte memory, an 80-col. display and a communications port are required for use.

ACE is priced at $349.

Communications Resources, Suite 110, 31220 La Baya Drive, Westlake Village, Calif. 91362.

■ Brilliant Image has announced two communications software programs for users of graphics on the IBM Personal Computer.

Telewriter II PC is an interactive blackboard that reportedly allows multiple micros to transfer and edit graphics images over dial-up telephone lines. Graphics files that can be modified with the product include those created with Lotus Development Corp.'s 1-2-3 and Symphony software.

Telewriter II PC requires an IBM Personal Computer or Personal Computer XT with two RS-232 communications interface ports and a minimum of 256K bytes of memory, plus the memory requirement for the software environment in which the graphics files were created.

Data Reader is said to allow users to download graphics data from an IBM mainframe to an IBM Personal Computer, Personal Computer XT, AT, 3270 or PCjr. The software reportedly simplifies the process and reduces the cost of converting mainframe data into graphs and charts, which can be edited on the micro.

Data Reader requires 256K bytes of memory.

Telewriter II PC is priced between $3,500 and $5,000, depending on configuration. The cost of Data Reader is $150.

Brilliant Image, 141 West 20th St., New York, N.Y. 10001.

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STORAGE

■ Cipher Data Products, Inc. has introduced a version of its 5210 26M-byte tape backup system for the IBM Personal Computer AT and for machines compatible with the XT.

The version for the AT, the 5210-AT, can also be used with the XT and includes software and a disk controller card.

The model for the XT compatibles, the 5210-C, reportedly does not require special interface electronics and can emulate a diskette drive. Software and a disk controller card are included.

Each unit costs $1,195.

Cipher Data Products, P.O. Box 85170, 10101 Old Grove Road, San Diego, Calif. 92138.

■ Alloy Computer Products, Inc. has announced Super Qicster-Plus, a storage subsystem designed for the IBM Personal Computer line.

The subsystem consists of a 130M-byte, 5¼-in. hard disk; five expansion slots; and a tape drive. The hard disk drive reportedly has a data access time of 18 msec and a data transfer rate of 10M bit/sec. The ¼-in. car-

Continued on page 86

The HP 3000 compu

However much you change, you're going to need both office automation *and* distributed data processing. Fortunately, one company gives you both in a single system.

Hewlett-Packard's HP 3000 is a fully compatible family of computers, ranging from a new system that handles as few as two users to a distributed mainframe that connects up to 400. You can run the same software right up the line.

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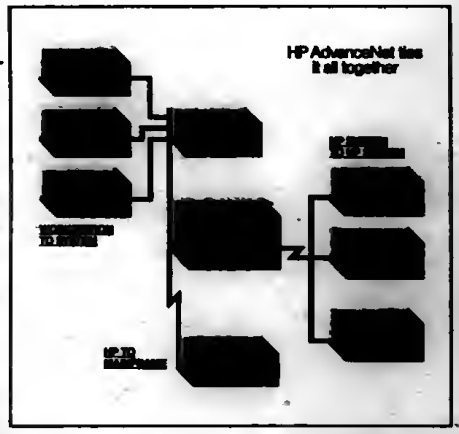

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HEWLETT PACKARD

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MICROCOMPUTERS

Continued from page 83

tridge tape drive has a formatted capacity of 60M bytes.

Super Qicstor-Plus reportedly can serve as a hub of a multiuser system with Alloy's PC Slave expansion cards or as a file server for the IBM PC Network, 3Com Corp. Ethernet series, Corvus Systems, Inc.'s Omninet and Proteon, Inc.'s Pronet.

Super Qicstor-Plus is priced at $10,595.

Alloy Computer Products, 100 Pennsylvania Ave., Framingham, Mass. 01701.

■ CMS, Inc. has announced expansion products for AT&T's Unix PC and Compaq Computer Corp.'s 286 Deskpro and Portable computer lines.

One expansion kit reportedly includes a 20M-byte hard disk, random-access memory (RAM) cards that supply up to 1.5M bytes of storage and parallel or serial ports. CMS is also offering 25M-byte, 45M-byte and 60M-byte tape backup systems that feature streaming, file-by-file and specific file backup capabilities.

An expansion package that consists of a 20M-byte hard disk, 384K bytes of RAM, serial and parallel ports costs $1,195. A 25M-byte hard disk sells for $695, a 40M-byte disk costs $950, and a 60M-byte disk is priced at $995.

CMS, 401-B W. Dyer Road, Santa Ana, Calif. 92707.

■ Reference Technology, Inc. has announced a laser-optic compact disk drive to provide read-only memory (ROM) data to users of the IBM Personal Computer, Personal Computer XT and AT.

The Clasix Data Drive Series 500 reportedly allows micro users access to 4¾-in. prerecorded compact disks storing up to 550M bytes of data. It is compatible with drives manufactured to the Philips Corp. and Sony Corp. compact-disk ROM standard.

The vendor also announced Sta/F File software for use with the drive. The software reportedly optimizes and standardizes the format of large data bases stored on ROM disks for the PC-DOS operating system. Also, Reference Technology introduced its Tridecc data preparation service, said to convert magnetic tape data to the Clasix optical compact disk.

Cost of the Clasix Data Drive Series 500 is $1,595. Sta/F File software is priced at $110 per user site. Tridecc data preparation services cost $8,000 per disk side plus $250 per additional reel of input data tape.

Reference Technology, 1862 N. 55th St., Boulder, Colo. 80301.

■ Digi-Data Corp. has introduced its 2000 PC, a ¼-in. tape backup and media interchange system for the IBM Personal Computer line, including the Personal Computer AT.

The 2000 PC reportedly includes software to permit the exchange of Ascii, Ebcdic and binary files with mainframes and minicomputers that can run the ¼-in. tapes it produces.

Included with the system reportedly are a tape controller board, interconnect cables and IBM PC-DOS-based software utilities.

The 2000 PC costs $2,995.

Digi-Data, 8530 Dorsey Run Road, Jessup, Md. 20794.

FAMILY from page 75

puter AT, AT 3270, AT 3270 Model G and AT 3270 Model GX; the 3270 Personal Computer series; the Personal Computer XT/370; the Personal Computer AT/370; the Desktop Series 1, in either AT or XT versions; the System/36 Personal Computer; the 4700 Personal Computer, a financial industry version of the XT; and the 5531 Industrial Computer, which is based on the Personal Computer.

And that's not even mentioning the System 9000 line of personal workstations based on the Motorola, Inc. 68000 microprocessor.

IBM, of course, believes that this diversity arises from a realization that "one size does not fit all," according to spokesman Rick Scott of IBM's Entry Systems Division. "A greater selection of choices," he said, "improves the likelihood that a customer can find the solutions for his particular need."

While that may be true, I suspect that IBM is uneasy about its plethora of diverse personal computers. Aaron Goldberg, director of microsystems services with International Data Corp. in Santa Clara, Calif., has suggested that IBM could save money by only manufacturing one basic Personal Computer chassis and motherboard, the latter based on the Intel Corp. 80286 microprocessor of the Personal Computer AT.

Big Blue is likely to do this in the next year or so, Goldberg predicted, and when that happens, the computer maker will be able to slap features into the chassis in response to market demand for specific functions.

Bring order to chaos

To bring order to all of this confusion, I recommend that potential Personal Computer buyers pretend there are only three IBM machines: the Personal Computer, the XT and the AT. They can gain any additional functions beyond those provided in the three machines by using expansion boards and software.

A certain amount of courage will be needed here, because much of the add-on functionality is available from third-party vendors. To use such vendors is no guarantee of IBM compatibility, but, as the Personal Computer AT has shown, neither is buying from IBM.

IBM, meanwhile, could hold in check its desire to add a new machine for every possible use — or to use every remaining letter in the alphabet.

COMMUNICATIONS

DATA STREAM
John Dix
CW Senior Editor

Voice mail: Boon or bane?

Modern, intelligent and feature-laden telephone switches — now typically referred to as communications processors — are supposed to increase office worker productivity, that fabled measure by which office automation systems are judged.

Some technological innovations, however, are implemented without thinking through all the implications.

Take voice mail systems, for instance. Ideally, voice mail facilitates the collection of messages so that the called party can return calls on a more timely basis. The calling party is greeted with a personalized recorded message saying the person sought is unable to answer the phone and inviting the caller to leave a message. So-called telephone "tag" is reduced and message handling is expedited.

Well and good.

But voice mail systems introduce a new concept to telephone etiquette: selective answering. Now people can forward all of their calls to their voice mail boxes, check their messages periodically and return the ones they wish. Or, if it suits them better, they can answer calls when they want and have the rest automatically routed to their voice mail box after a predetermined number of rings.

While selective answering is possible with the secretary-and-pink-paper-pad message system, few users would be able to get away with forwarding their calls in this manner all day, everyday. Secretarial staffs would have to be doubled to carry the load.

Selective answering is both good and bad. From the end user's perspective, call forwarding can end pesky calls and reduce work interruptions, a paradoxical productivity boost that designers of voice mail systems probably did not

See SELECTIVE page 92

Bank to replace digital net with analog lines

By John Dix
CW Staff

BOSTON — While conventional wisdom dictates the migration from analog to digital network links, a large New England bank headquartered here is preparing to buck convention and migrate half of its digital network back to analog facilities.

In the creation of a network structure designed to provide for resource sharing and vendor independence, the bank — which preferred to remain anonymous — concluded that, given state tariffs, it made better business sense to replace its digital facilities with analog lines.

The bank currently operates two major digital networks that support more than 150 branch locations. Each branch typically has two automatic teller machines and an IBM 4700 finance system.

The bank's headquarters serves as the hub for both star networks, which consist predominantly of multidrop digital facilities provided by New England Telephone & Telegraph Co. The network of more than 300 ATMs uses 2,400 bit/sec. digital links, each of which support eight to 10 teller machines. The 4700 network operates at 4.8K bit/sec. and typically supports five or six machine drops per line.

The bank wanted to evolve these networks into a single net that would be independent of proprietary vendor network schemes and enable users to access multiple host processors.

"The vendor neutrality design concept said you could segregate the physical aspects of a net — the lines, modems, protocols — from the logical aspects," according to the bank vice-president in charge of the project. Such a net would, for example, enable simultaneous support of IBM's System Network Architecture and Digital Equipment Corp.'s Digital Network Architecture.

To achieve the most efficient, least costly multiple access capability — from a CPU capacity perspective — the bank determined some switching must be built

See ANALOG page 92

Report aims to ease complex task of selecting cabling, net schemes

MINNEAPOLIS — The proliferation of cabling and networking schemes has further complicated the job of telecommunications and MIS managers trying to evaluate available options.

A recent report from Architecture Technology Corp., a consulting firm here, outlines the decision-making process and methodology used by a large corporation in its evaluation of such systems and, as such, provides a road map other companies can use.

The report, "How to Evaluate and Select Local-Area Networks/Cabling Systems," was drawn from the American Express Co.'s experiences in picking a system to wire its new world headquarters, the Amex Tower in New York. The report was written by Mino F. Akhtar, manager of advanced technology group in the corporate systems and technology department at American Express, and Mark A. Lieberman, vice-president with Shearson/American Express, Inc., a subsidiary of American Express.

Although American Express chose the IBM Cabling System for its building, the report has reportedly been generalized as a case study that illustrates issues and decisions a company would probably face when choosing a network or cabling solution.

The report is divided into 10 chapters that outline from start to finish a project plan that other companies can use in their own evaluation and selection efforts. The authors stress that managerial rather than technical issues are the focal point of the report. Only one chapter deals with techni-

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■ Centrigram has added an automated telephone receptionist to its voice messaging product line/91

■ Ztel is offering tenant support capability as part of its Private Network Exchange software/91

■ Unique Automation Products has announced an enhanced version of its UAP-Link file transfer software/91

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Racal-Vadic MDS-II allows local, remote net control

System can be reconfigured to meet traffic requirements

MILPITAS, Calif. — Racal-Vadic, Inc. has introduced a network management system said to enable users to control a network either locally or from a remote terminal.

MDS-II includes the VA1690 chassis, VA990 control card, VA2190 power supply card, VA4491E triple-speed modem and the VA9000 System Controller. The modem-based system can be used to gather statistical information on network performance and usage and enables reconfiguration to meet traffic needs, the company reported.

The VA1690 chassis can accommodate any combination of up to 32 modems — two per slot — within a standard 19-in. rack. The chassis has 16 slots and also supports the controller and an open slot for growth.

The chassis' front panel includes status line indicators, signal indicators, a two-line by 16-char. LCD and a keypad. The keypad and display can be used for alarm messages, modem status and call status. They also enable a user to enter operational commands, configure modems and perform diagnostic testing.

The VA4491E modem for use with the system is a V.22-, AT&T 212A- and AT&T 103-compatible modem that can be configured for use with dial-up or leased lines.

It reportedly provides full-duplex asynchronous and synchronous operation at 1,200 and 2,400 bit/sec. and asynchronous operation from 0 to 300 bit/sec. The modem automatically adjusts for speed and parity.

The VA9000 System Controller is a personal computer-based option that is said to provide supervision, monitoring, configuration and network testing. The device can control up to 256 chassis and more than 8,000 modems, the vendor reported. From a central site, more than 50 modem options can be selected and executed at a remote location. The controller can be used to compile event, summary and diagnostic statistics for any modem on the network.

The VA1690 chassis costs $3,260, and the VA4491E modem is priced at $1,095. The VA9000 System Controller, an interface board for an IBM Personal Computer or compatible and proprietary software, is priced at $3,500.

The MDS-II will be available in July, according to the vendor.

Racal-Vadic is located at 1525 McCarthey Blvd., Milpitas, Calif. 95035.

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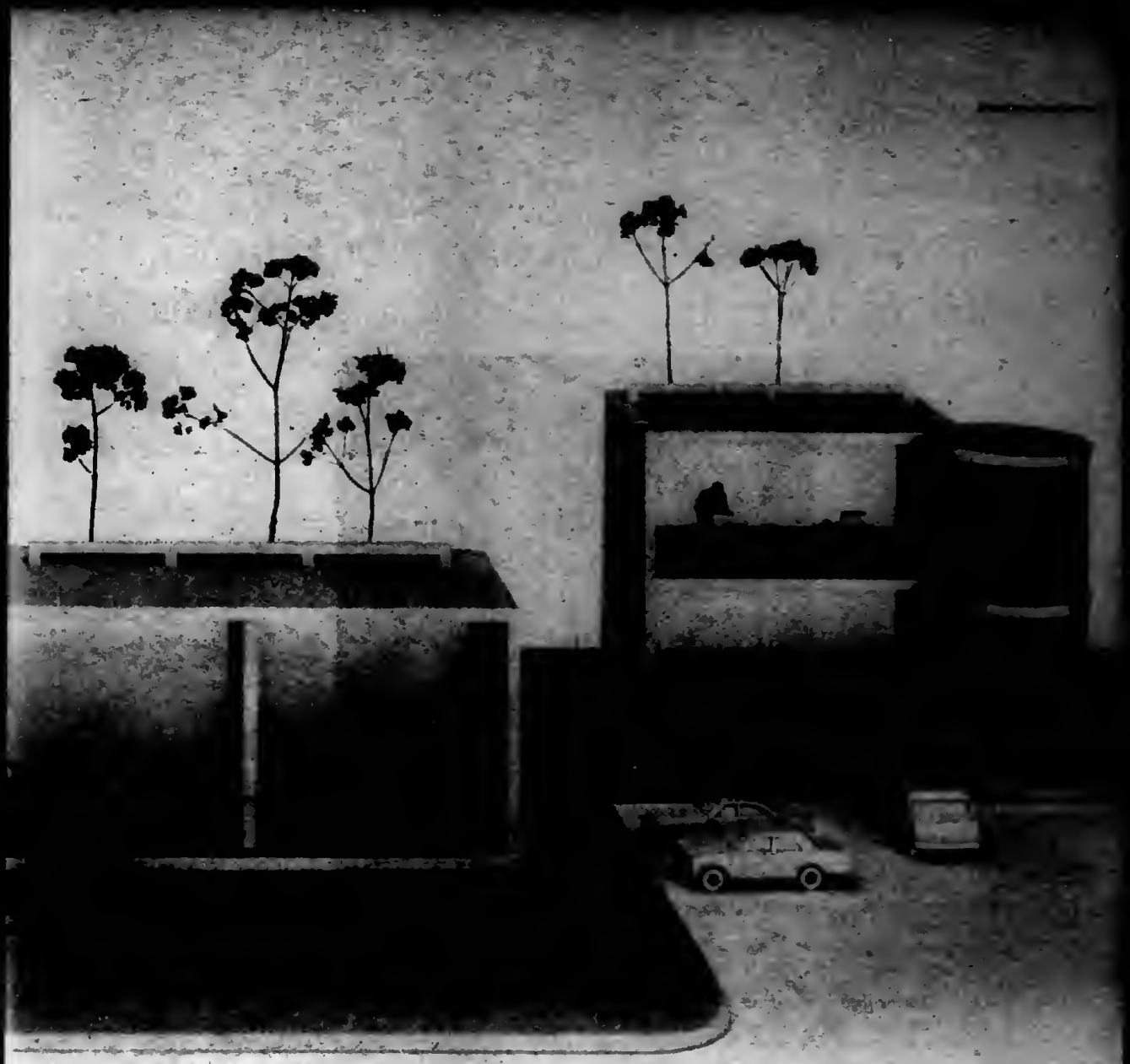

And all equipment—voice, data, video—connects to universal jacks that fit standardized wall outlets. To add or move equipment, you just plug it in wherever you want it. No rewiring. No tearing down walls. No confusion or delay.

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cal issues, such as the differences between token-ring and bus network topologies.

After the statement of the problem, the first step the report recommends is to inventory the company's computer systems and outline inventory procedures. It is not unusual to find even the largest companies lacking an inventory system, the report claims. A company can then determine its present communications patterns and estimate future equipment and connectivity needs.

After those items have been determined, possible system and architecture constraints and alternatives are presented. The next report item deals with issuing and evaluating a request for proposals. Lastly, the report presents a cost/benefit analysis.

While American Express ultimately selected the IBM Cabling System wiring scheme, the report is not intended to be an unequivocal endorsement of the IBM system, the research firm reported.

Some items discussed include issues related to the physical implementation of a network such as cable runs, furniture cabling, selection of network points, placement of processors and stationing of controllers. The report also addresses the question of staffing the implementation with company personnel or consultants, managing the final bidding process, and scheduling the actual cutover and initiation of the system.

The report costs $355 in the U.S. and $415 in foreign countries.

Architecture Technology can be reached through P.O. Box 24344, Minneapolis, Minn. 55424.

SOFTWARE

■ Unique Automation Products, Inc. has announced an enhanced version of its UAF-Link file transfer software that allows transfers among systems from Data General Corp.; Digital Equipment Corp.; Sun Microsystems, Inc.; Gould, Inc. and other vendors.

UAF-Link now reportedly can move text and binary files among systems running AT&T Unix, IBM VM/CMS, DG AOS/VS, S&H Computer Systems, Inc. TSX-Plus and DEC VAX/VMS operating systems. Other micro and mini systems supported are the IBM Personal Computer, DEC Rainbow, DEC PDP-11 and DEC Decpro. UAF-Link costs $250.

Unique Automation Products, Suite G, 15401 Red Hill Ave., Tustin, Calif. 92680.

VOICE/DATA COMMUNICATIONS

■ Etel, Inc. has announced it is offering tenant support capability as part of its Private Network Exchange (PNX) software. The tenant support capability will enable a building developer to provide shared voice and data communications service on a single PNX system to multiple tenants.

The PNX software can support 1,048 ports, or approximately 900 lines, the vendor said. The PNX allows functions and capabilities to be offered on a tenant-by-tenant basis.

Prices for the PNX software range from $600 to $1,000 per line.

Etel, 181 Ballardvale St., Wilmington, Mass. 01887.

AUXILIARY EQUIPMENT

■ Xerox Corp. has announced Xerox 871, a communications module that enables a Xerox 8700 laser printer to work in an IBM Systems Network Architecture (SNA) net.

The product supports Synchronous Data Link Control so a Xerox 8700 printer would appear to an SNA net as an IBM 3776 or 3777 Model 3 RJE workstation.

The product sells for $9,000.

Xerox, Xerox Centre, 101 Continental Blvd., El Segundo, Calif. 90245.

Centigram introduces automated receptionist

SAN JOSE, Calif. — Centigram Corp. has added an automated telephone receptionist that supports 50 to 1,000 extensions to its voice-messaging product line.

The Receptionist can answer an incoming telephone call, provide a recorded company greeting, ask the name of the person calling and have the caller enter the extension sought, the company reported.

If the extension is busy or is unanswered, the package informs the caller and allows him to leave a voice message, try another extension or hang up.

A call screening feature tells the person called who is trying to reach him and gives him the choice of accepting the call or having a message taken. To accept a call, a user would press A and to reject it, he would press R.

If a caller does not know the proper extension, the system will route the caller to a receptionist.

A direct extension access enables callers to dial a number directly rather than going through a switchboard.

The system costs $4,995.

Centigram is located at 1683 Ringwood Ave., San Jose, Calif. 95131.

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into the network instead of having that provided strictly by attached hosts.

These requirements dictated the network structure. The new plan calls for the bank to establish three interconnected network hubs. Each hub will support local bank branches on a point-to-point basis, replacing the current multidrop lines. The point-to-point links will use time division multiplexing and support multiple protocols to provide vendor neutrality. The hub structure will provide the switching necessary for multiple access.

Once the network structure was determined, the bank began looking at the economics of implementing the communications facilities. "The network structure is the most important consideration," the vice-president explained. "The analog/digital issue is secondary because the network can use either."

The bank's analysis of analog and digital facilities led to the decision to migrate its digital network back to analog, a conclusion that the vice-president said is "counterintuitive."

The primary finding of the facilities analysis was that digital links in New England are two to three times more expensive than analog circuitry, according to the vice-president. After considering differences in the cost of the communications equipment required with either system and differences in performance, the bank decided it could not justify digital service.

High-speed 9.6K bit/sec. modems are two to three times more expensive than comparable digital service/customer service units (DSU/CSU) used with digital links, the vice-president said. But that cost differential evaporates when you add multiplexing options. The multiplexing option for digital DSU/CSUs is four to fives times as much as the same modem option, so the equipment ends up costing roughly the same.

The modem multiplexing option will enable a 9.6K bit/sec. link to be used as if it were three separate lines, one running at 4.8K bit/sec. for the IBM 4700 at each branch and two operating at 2,400 bit/sec. for the ATMs.

In terms of digital vs. analog performance, the bank weighed a number of considerations. The average time to repair digital links is shorter than with analog facilities, but the most time-consuming portion of fixing anything is dispatching maintenance personnel, a requirement common to either type of facility.

The higher reliability of digital facilities reduces the number of retransmissions required, but the overall difference in reliability is not that great, the bank found. The vice-president said that with digital links, 99.7% reliability might be typical, as opposed to 99.1% with analog facilities.

While the bank will migrate most of its branch office links to analog lines, it will retain digital service between its three network hubs.

Most important, the network structure will enable the bank to use either type of link. "We can take advantage of analog where it is feasible and the service is acceptable and digital where it makes sense," the vice-president said. "We'll stay with the market forces."

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anticipate. But on the down side, the question is whether it is in the corporate interest to have workers indiscriminately forwarding their phones. Will messages that would be forced to the fore without voice mail be delayed with the electronic system?

At the very least, the advent of selective answering requires telecommunications managers considering the technology to examine carefully the users who would be given voice mail boxes. Personnel in customer service-oriented jobs may, for example, benefit the most from voice mail. Conversely, they also have the potential of becoming the worst offenders of the system.

Ironically, both the proponents and the purveyors of voice mail systems are often blind to the down side of the technology. Faced with a deadline, this reporter recently tried to call the public relations bureau of Rolm Corp. for a comment regarding an upcoming conference. After waiting through the polite recorded Rolm Phonemail message saying the called party couldn't answer her phone, I pushed a few buttons as instructed by the message and reached the operator.

The operator forwarded me to another extension where, yes, I was greeted by another voice message. A third and fourth number elicited the same type of cheery recorded messages. No humans were available to point me in the right direction.

Client-intensive departments in other operations have made the same mistake. It is a good chance that, on any given day, five out of six people at the Yankee Group, a Boston-based research firm that specializes in communications, will have their phones forwarded to their mail boxes.

While the Yankee Group's researchers probably enjoy the peace and quiet and turn out more work — a plus for voice mail — is it smart for the firm to give voice mail boxes to everyone? Should its public relations personnel have a voice mail box? Its salesmen? What is the implication to the company of a potential client — or a newspaper reporter seeking a quote — becoming frustrated by the system and turning elsewhere?

While it is hard to quantify and balance the benefits against the drawbacks, it should be noted that voice mail is not a messaging panacea that can or should be implemented blindly.

SYSTEMS & PERIPHERALS

Firm unveils simulation engine

MENLO PARK, Calif. — Silicon Solutions has taken the wraps off a simulation engine that performs logic and fault simulation of integrated-circuit and printed-circuit board designs. The company also released an accelerator subsystem that is said to enhance the performance of its Fast-Mask Engine.

The Mach 1000 simulation engine, which uses the University of California at Berkeley's 4.2 version of AT&T's Unix operating system, is a hardware accelerator said to accommodate 65,000 gates for logic simulation on a single accelerator board. The unit reportedly uses customized very large-scale integration chips. Fault simulation requires an additional board. The engine's free-standing tower has room for eight additional boards for expansion capacity up to 500,000 gates. Towers can be coupled together to achieve a two-million gate capacity, the vendor said.

Logic and fault simulation at the gate level are implemented in special-purpose, proprietary chips that are said to simulate 1,000 times faster than software. The switch and behavioral-level simulations are handled in HHB-Softron's Computer-Aided Design and Testing (Cadat) software.

The Mach 1000 can function as a stand-alone dedicated processor or as a network server shared over Ethernet by any system in the computer-aided engineering and computer-aided test environments, including HHB-Softron's Computer-Aided Test System hardware modeling computer.

A logic simulator with a 65,000-gate capacity costs $85,000; a log and fault simulator with the same capacity costs $150,000. The engine includes a license to

See SIMULATE page 103

TI Business System minis get memory enhancement

AUSTIN, Texas — Texas Instruments, Inc. has announced enhancements to its Business System 300A minicomputer line. The enhancements include a doubling of the main memory of the machines at no additional cost to users.

Other enhancements include the following: a one-year or optional three-year warranty plan, a switch to dynamic random-access memory (RAM) chips and the TI WD800A disk system. TI will also provide field service for a third-party multiplexer that allows a TI 300A system to support up to 16 terminals.

All Business System 300A models will now have a standard 512K-byte RAM instead of 256K-byte memories, the vendor said. The larger systems, the 372A, 374A and 375A, are said to be available with 1M byte of on-board memory.

The 256K-byte dynamic RAM chips incorporated in the systems are said to increase the maximum memory capacity from 1M byte up to 1.75M bytes to allow larger application programs to be run. The TI WD800 disk drives have been replaced with WD800A enhanced drives, the vendor said. The 42M-byte WD800 had an access time of approximately 75 to 80 msec., and the WD800A has an access time of 35 to 40 msec. The WD800A comes in three capacities — 38M, 66M and 114M bytes of formatted storage.

The warranty plan is said to change the previous 90-day on-site warranties that came with the system to a one-year carry-in service with an option to convert to on-site coverage. The middle of the 300 series line — Model 372A, for example —, previously came with free 90-day on-site warranty and now comes with a free carry-in

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■ Planning to install hardware? Some tips/96

■ Four Phase Systems unveiled a 32-bit Unix-based supermicro/98

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HARDTALK

IBM 3080s may not be dead yet

By Tom Hoehst
CW Staff

With sales of IBM 3080 mainframes in a slump and IBM users waiting for the newer IBM 3090 series mainframes, could IBM be thinking about giving users their cake and 3080s too?

There has been some speculation that IBM may be planning to extend the life of 3080 series mainframes by cooking up some alternate uses for the big boxes. The idea sounds a bit far fetched but not beyond the realm of possibility. There is nothing really wrong with 3080s, they have just been superceded by newer technology processors. If IBM could refocus the 3080, it could further capitalize on all that expensive 3080 R&D.

For example, IBM might consider the following:

■ In the wake of Fujitsu Ltd. and Hitachi Ltd.'s plans to offer supercomputers through their domestic marketing arms, Amdahl Corp. and National Advanced Systems Corp., respectively, there is increased pressure on IBM to

See HARD page 103

From code busters to mainframes: the history of CDC

By Donna Raimondi
CW Staff

Control Data Corp. was born in 1957, but the roots of the company date back to World War II.

At the end of the war, William C. Norris and his colleagues Cmdr. Howard Engstrom, engineers Seymour Cray, Bill Keye, Frank Mullaney and a handful of other associates from the U.S. Navy's intelligence units took advantage of the Navy's continuing interest in developing new devices that would become the forerunners of the digital computer. The group — enemy code breakers during the war — started a private company, Engineering Research Associates (ERA), which soon became known for its electronic data processing and storage devices.

ERA was sold by its major shareholder, investment banker John E. Parker, to Remington-Rand Corp. in 1952, against the wishes of Norris and the firm's other technical people. Norris, in a recent interview, said the sale taught him an important lesson: one person should not hold a majority position in the outstanding shares of a company.

"When Control Data was formed, I went to great lengths to ensure that that did not happen. In fact, I was the largest stockholder, and I never had over 15% of the company," he said.

By 1955, Remington-Rand had linked with Sperry Corp. to form Sperry-Rand, and Norris had become vice-president and general manager of the Univac division at Sperry. Norris urged Sperry-Rand to put all its efforts into computer operations, a move he saw as the wave of the future.

The Univac division soon found itself losing money because, in some corporate executives' opinions, Norris was spending too much money on research and development. Bad feelings resulted, Norris said, and despite the chief executive officer's pledge to support Norris, he decided that Univac would never be successful in that environment.

In the summer of 1957, Norris, frustrated at what he felt was Sperry's sluggish reaction to the burgeoning large-scale computer business of IBM and at his diminishing control in the huge company, quit his job with Sperry to form CDC. He took with him eight of his key associates at Univac.

Univac quickly retaliated by suing the group of former employees, charging they walked off with corporate trade secrets. The suit was settled in 1959 when CDC promised not to use classified material that Sperry said the engineers at CDC learned in their years at Univac.

By Oct. 1, 1957, 12 employees started laboratory work on the first fully transistorized computer, the CDC 1604, designed by Cray, who was wooed by Norris from the ERA part of Sperry's Univac division. The Navy purchased the first CDC 1604, a machine that was designed for scientific, simulation or control applications in which extensive computations were needed.

See CDC page 96

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Four Phase targets IBM nets with Unix-based supermicro

CUPERTINO, Calif. — Motorola/Four Phase Systems, Inc. has released a 32-bit AT&T Unix-based supermicrocomputer said to be targeted at distributed office locations operating IBM Systems Network Architecture (SNA) or Binary Synchronous Communications (BSC) networks.

The Model 260 — an addition to Motorola/Four Phase's Series 2000 family of computers — offers support for up to 12 users. It features a Motorola, Inc. 68010 processor with error-correcting memory and virtual memory support.

The unit, with 1M byte of memory, an intelligent communications processor, a 52M-byte Winchester drive and a removable 5M-byte disk for backup, costs $20,495. The system is said to support up to seven 52M-byte disks for a total of more than 350M bytes of storage.

The company's previous 240 and 280 models are said to be upgradable to 260s in the field with no reprogramming. All three of the Series 2000 models share common workstations, disks and system architectures, the vendor said.

More information can be obtained from Motorola/Four Phase Systems, 10700 N. De Anza Blvd., Cupertino, Calif. 95014.

Systematic planning helps avoid installation hassles

SHOP TALK
John Roncone

In order to install computer hardware successfully, one must develop a good plan and provide the necessary supervision to make sure the plan is followed.

The most important part of the plan is determining preinstallation requirements. Such an evaluation should include the following:

- Determining the location.
- Evaluating the building and the computer room.
- Seeking vendor consultation.
- Evaluating physical planning specifications.

The location of a computer system must meet the objectives of the company's long-range plan. Location depends on whether the computer being installed will be a centralized, decentralized or distributed system. Provisions should be made for expansion.

A building with a receiving dock is probably the most appropriate, because a building without one may require construction of a high lift or a ramp to get the computer in it.

Placement of the computer room in the building is also important. For example, basement floors are subject to water and flooding. The top floor of a building can also be subject to water problems, because the roof can leak. On the intermediate floors, there can be problems with weight capacity.

Also, be sure to plan for fire prevention devices, adequate power, an elevator with the proper weight capacity if applicable and doors that are wide enough to allow equipment to be moved around.

Select a room that allows at least 20% in additional space for growth. Be wary of direct sunlight and plan to provide separate air-conditioning and power systems for the computer room.

When planning the physical layout, pay attention to factors that could affect the system, such as static surfaces, vibration, temperature variations and humidity levels.

Be sure to include vendor representatives in the planning process. Think about whether you want to have a hardware and software planning committee that meets periodically to ensure the success of the project.

Vendor representatives may vary depending on the issues being addressed. Usually the vendor representatives will include a marketing representative, a hardware specialist and a software specialist.

Installation planning meetings should address the major milestones documented in the plan. For instance, the marketing representative should be at installation planning meetings when the features and the shipping dates of hardware components are discussed. When the physical layout of the computer room and equipment and service requirements are discussed, the hardware specialist should be present. Finally, when the operating system and system generation are discussed, the software specialist should be present.

When the system is installed, there should be enough room on each side of the unit to allow the doors to be opened freely for equipment repair. Ask the vendors in advance for specifications of all the equipment to be purchased, from the CPU down to the desks, chairs and cabinets.

Roncone is a professor in the Computer Science Department at Kent State University's East Liverpool regional campus in Ohio.

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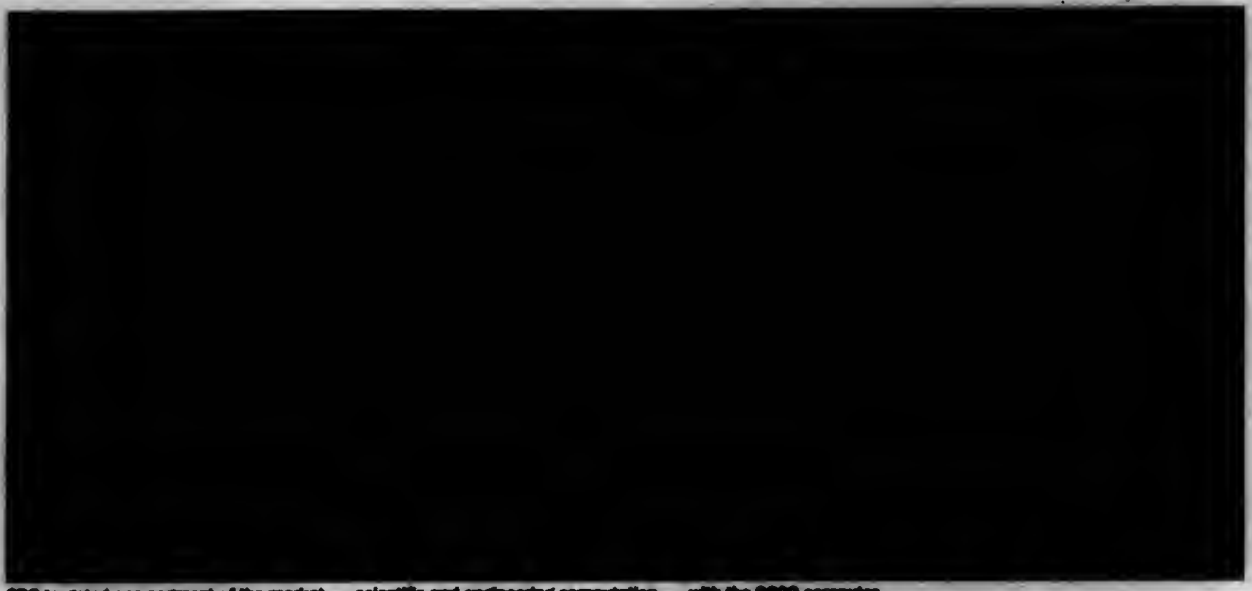

CDC targeted one segment of the market — scientific and engineering computation — with the 6600 computer.

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In the spring of 1959, CDC announced its Model 160, a desk-size solid-state computer for small-scale scientific applications. Various enhanced models of the 1604 and the Model 160 were announced during the next few years. In May 1962, the first of the medium-size 3000 series was unwrapped. Like the 1604A, it had a 48-bit word length.

Lawrence Radiation Laboratory in Livermore, Calif., placed an order for a Cray-designed Model 6600 immediately after the system's announcement in July 1962. The 6600 was scheduled for delivery in February 1964. The new model, packed with 350,000 transistors, proved to be difficult to debug, however, and was not actually delivered until September 1964.

"We decided to focus very strongly on one particular segment of the market — scientific and engineering computations — and it was a very wise decision," Norris said. "Our early computers said so well that IBM became alarmed. They zeroed in on us with . . . practices which finally led to the lawsuit that Control Data filed against IBM."

IBM announced its 360 Model 90 machine between the time of CDC's 6600 announcement and its installation. Neither machine was ready for the market, as the 6600 had production difficulties, and the 360 Model 90 was an idea but not a reality when IBM's sales representatives started touting it, according to a recently published book, *The Computer Establishment*, by Katherine Fishman.

Norris was angered by IBM's tactics of announcing machines and enhanced versions of machines before they were ready, tactics that forced CDC to give its customers more enhancements at cheaper prices before it was ready to do so.

In the meantime, CDC lawyers collected evidence against IBM, which they presented to the U.S. Department of Justice in hopes that the government would sue IBM for violations of federal antitrust laws. In December 1968, CDC tired of waiting for the government, and it formally filed suit against IBM, charging 37 instances of monopolistic practices. The government filed its suit a month later.

The lawsuit against IBM was countered with equal ferocity by IBM. IBM filed suit against CDC claiming that CDC engaged in reciprocal marketing practices: giving its business to companies that bought CDC computers and taking it away if the company did not buy its equipment.

The suits were hurting both companies, and in January 1973, the companies announced an out-of-court settlement. CDC agreed to buy IBM's Service Bureau Corp., a subsidiary that provided remote computing services to businesses in the same way as CDC's consolidation of small service bureaus and data centers did. Service Bureau had became the Cybernet remote computing network and provided remote computing for scientific customers. IBM gave CDC more than $100 million worth of subsidies, and in return, CDC destroyed all the documents it had compiled about IBM's practices.

"We learned early on that you can't compete head on against IBM," Norris said about strategies CDC developed to build its business. To protect CDC from IBM, Norris acquired small peripherals companies, and CDC became the largest peripherals supplier in the industry. He scooped up service bureaus to handle companies that were overloaded or that did not want to invest in their own computer centers. To handle the burgeoning need for computer technicians, he established CDC schools. In 1968, CDC acquired Commercial Credit, a finance company with gross assets of more than $3½ billion, a move that allowed CDC to survive the 1970-71 recession in which the company's computer operations lost millions of dollars.

Norris

"The one [strategy] that was most effective early on was [based on a feeling that] there was a market for computers with very little software," Norris said. The scientists and engineers that CDC catered to generally wrote their own software, so the company could sell a bare-bones system that included the operating system and little else, he said. The resulting lower price of equipment was one of the reasons for the early and strong success of the company's scientific computers, he said.

In 1973, Cray resigned to form his own company. "There wasn't any impact [on CDC] at the time of his departure because we couldn't afford to get another supercomputer project under way then. The impact came later when he got his first machine on the market," Norris said.

"We are philosophical about it," he said. "You have got to have good competition, and Seymour is good competition — in fact, the best."

CDC continued to develop supercomputers after Cray left when the Star machine was in production, Norris said. ETA Systems, Inc. was formed in 1983 with about 100 CDC employees to "design and manufacture the most powerful supercomputer in the world by 1987," according to CDC literature. "It goes back to that early experience that I had in ERA and in Control Data of giving people part of the ownership to provide some incentive. We felt that to make it a separate company in which we owned a substantial portion would be the best for everybody concerned. They are making excellent progress, and we will see that approach proven to be very sound again," Norris said.

Various mainframe computers continued to be created at CDC, including the company's Cyber line that started in 1970 with the Cyber 70 series and has continued into 1985 with a series of 800 models.

In addition to the diversified business interests, Norris started several projects that address social problems. Training programs for handicapped workers and urban and rural programs for economically disadvantaged people use CDC's Plato computer-based education system to ready people for gainful employment.

"These [programs] are the future of the company," Norris said. "We have been investing in these things for quite a few years. It has been a difficult strategy for us, but it's going to pay off handsomely," he said. The programs are business opportunities, Norris stressed. Several of the programs have become profitable, he said.

Norris' confidence in these business opportunities is not shared by many CDC watchers. Bill Shaefer, a former general manager of communications at CDC for five years, for example, is not convinced that the social programs were a wise move for CDC. Norris is a technocrat — one who believes that society can be managed by technical experts — Shaefer said, but experience has proven otherwise. "Earnings are up, but profits are going the other way" because of the social programs, he said.

The day-to-day operations of CDC fall to Robert Price now, Norris said. "I'm involved primarily with working with our different constituents outside the company."

"I spend quite a bit of time helping to develop our relationships with other countries," Norris said. "Also, while Bob Price worries about the day-to-day operations, I'm very heavily involved in the projects addressing societal needs like education and training, health care and so forth. I'm really dealing in the future."

Control Data Corp. Family Tree

[redacted]

1604 (1960)

1604B (1960)

1604A (1962)

160 (desktop) (1960)

160A (1961)

160G (1964)

6000[1] (1964)

3000 series

3600 (1962)

3400 (1964)

3800 (1966)

3200 (1963)

3100 (1964)

3300 (1965)

3500 (1962)

6400 (1964)

1700 (1966)

Cyber 18 (1973)

6600 (1967)

6700 (1969)

6200 (1970)

7600 (1969)

Cyber 70 series (1971)

Cyber 72 Cyber 73 Cyber 74 Cyber 76

Cyber 170 series (1974)

Cyber 171 Cyber 172 Cyber 173

Cyber 170 series 700 (1979)

Cyber 170/720 Cyber 170/730 Cyber 170/740 Cyber 170/750 Cyber 170/760

Cyber 170 series 800 (1982)

Cyber 170/815 Cyber 170/825 Cyber 170/835 Cyber 170/845 Cyber 170/855 Cyber 170/865 Cyber 170/875

[redacted]

Cyber 180 series (1984)

Cyber 180/810 Cyber 180/830 Cyber 180/840 Cyber 180/850 Cyber 180/860 Cyber 180/980

Cybernet[2]

Star 100 (1970)

[redacted]

Cyber 205 (vector) (1979)

Cyber 205 (vector) (1981)

[redacted]

[1] Peripheral processor for 6000 series, Cyber 70, Cyber 170

[2] Peripheral processor for 800 series

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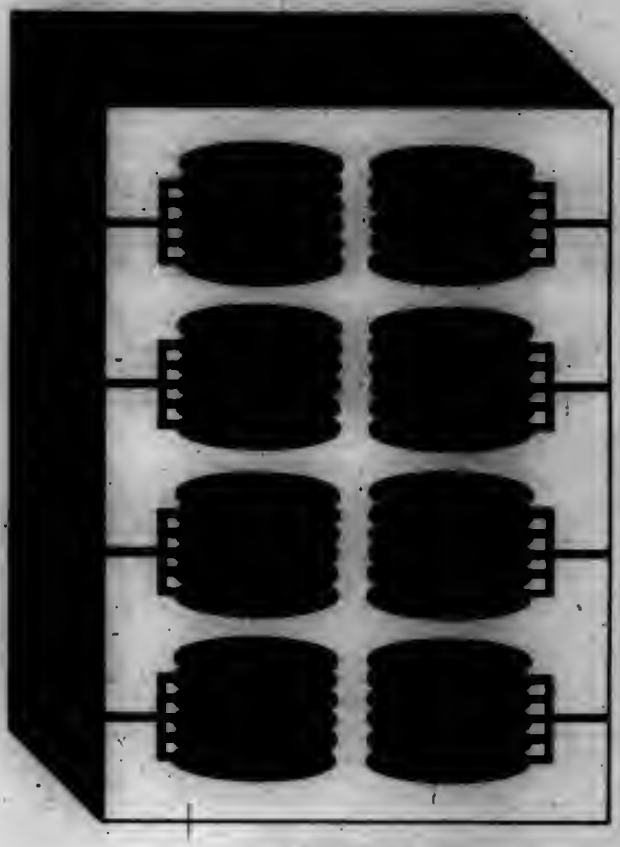

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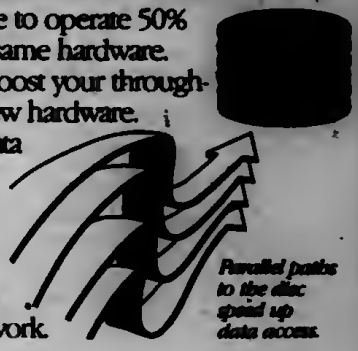

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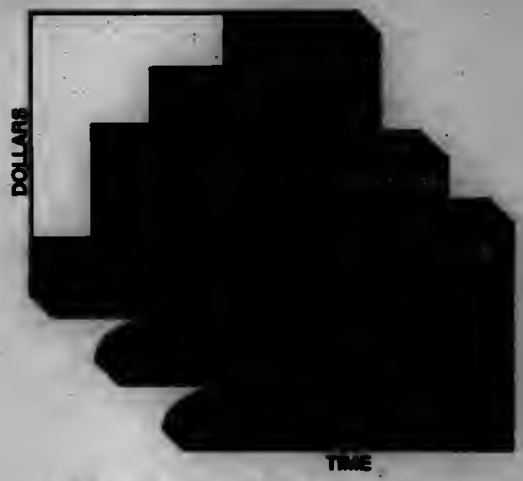

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TANDEMCOMPUTERS

SYSTEMS & PERIPHERALS

TERMINALS

■ Esprit Systems, Inc. has released a VDT that is said to provide emulation of Applied Digital Data Systems, Inc.'s Viewpoint terminal.

The ESP 6110+ is an enhanced version of Esprit's ESP 6110. Features include a 14-in. screen that is housed in a tilt-and-swivel case, a choice of green or amber screen and a 7- by 11-dot character matrix. The 6110+ operates at 50 to 19.2K bit/sec. speeds.

The unit costs $395.

Esprit Systems, 100 Marcus Road, Melville, N.Y. 11747.

■ Teleais Systems Corp. has announced a computer-aided design workstation and printed-circuit board design software for the workstation.

The EDA-700 workstation, for printed-circuit board design and mechanical applications, uses Digital Equipment Corp.'s LSI 11/73 microprocessor as the primary CPU. Graphics are supported by a proprietary Motorola, Inc. 68000-based graphics processor.

On-screen menus are accessed with a mouse or via function keys. The unit features a 19-in. color monitor with five assignable colors and a choice of three background colors. The 1K- by 2K-byte pixel room area can be increased to a 2K- by 2K-byte room area for $4,000.

The unit costs $43,000 with 1.5M bytes main memory and 65M bytes of disk capacity. The memory can be upgraded to 2.5M bytes for an additional $5,000, and the disk space can be expanded to 140M bytes for an additional $7,500. The EDA-700 is upgradable with the $19,000 EDA-650 coprocessor, the vendor said, which is said to double routing speed and provide an AT&T Unix environment.

The company also released its ECL Toolbox software for the design of ECL and Cmos-based printed-circuit board systems. Features of the package are said to include automatic scheduling and terminator assignment, daisy chain routing and report generation.

The ECL Toolbox costs $15,000.

Teleais Systems, Two Omni Way, Chelmsford, Mass. 01824.

■ Plessey Peripheral Systems, Inc. has announced a Tektronix, Inc. 4010/4014-compatible graphics terminal for Digital Equipment Corp. terminal users.

The PT-100G monochrome graphics terminal is compatible with DEC VT100 and VT52 terminals. It is said to offer a 14-in. nonglare screen in amber or green and has 1,024- by 780-pixel resolution.

The unit costs $1,295, according to the vendor.

Plessey Peripheral Systems, 17466 Daimler Ave., Irvine, Calif. 92714.

■ Westward Technology, Inc. has announced that its Model 3220W color graphics terminal is available domestically.

The 3220W offers resolution of 1,024 by 1,024 addressable pixels with refresh rates of nearly 60 times a second, according to Westward Technology.

The unit, equipped with an RS-232 interface, is used primarily with minis and mainframe computers, the vendor said.

The unit costs $15,450, and the optional eight-plane feature is an added $3,215.

Westward Technology, 90 Montvale Ave., Stoneham, Mass. 02180.

POWER SUPPLIES

■ Power General, a subsidiary of Unitrode Corp., has released a family of 150W, quad-output switching power supplies for microcomputers, disk drive systems, CRT terminals and digital/analog circuits.

The four models in the series — 4150-1, -2, -3 and -4 — give output combinations of 5, 12 and 24 volts dc, the vendor said.

Input voltage ranges of either 90 to 130 volts ac (Vac), or 180 to 260 Vac are available as a factory-wired option, according to the vendor.

The units are fabricated on a single 4- by 8- by 3-in. printed-circuit board that weighs 22 ounces.

All four models cost $169 each.

Power General, P.O. Box 159, 153 Will Drive, Canton, Mass. 02021.

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one-year warranty or an optional one-year, on-site plan that costs $492 to cover transportation costs for the year.

The cost of one-year, on-site coverage previously would have been $990 — $110/mo for the nine months not covered by the 90-day warranty, according to the vendor.

An optional three-year plan — either on-site or carry-in — is available for $2,772 for an on-site plan or $1,296 for a carry-in plan. Maintenance contract rates paid on a monthly basis have been reduced from $135/mo to $113/mo on the model 373A.

Warranty, maintenance upgrades

The warranty enhancements and maintenance reduction are said to be possible because of the incorporation of 256K-byte dynamic RAM chips and the use of the WD800A 5¼-in. hard disk drive.

TI also announced support for the Octacomm MCPU/300 Multiplexer, produced by Responsive Terminal Systems, Inc. of Dallas, which is said to support up to 15 terminals, doubling the current limit.

More information is available from TI at Data Systems Group, P.O. Box 809063, Dept. H-801, Dallas, Texas 75380.

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IBM from page 98

offer a product aimed at the scientific-oriented processing community.

Most industry watchers believe IBM will build on its relationship with Floating Point Systems, Inc. to develop some sort of supercomputer-like attached processor for IBM mainframes.

But what if IBM were to devise a scheme to use multiple 3090s working as parallel processors — especially if those parallel processors were being driven by a 3090 series processor? Most scientific IBM mainframe shops already have at least one 3090. Most of them have multiple systems. IBM now supports AT&T's Unix operating system on its mainframes, so it would not be out of the question to do what several companies have already done on a smaller scale: alter Unix so that it can support multiple processors in a parallel processing environment, thereby producing a series of processors with impressive overall power.

■ IBM has already admitted its interest in the transaction processing marketplace when it signed an agreement with Stratus Computer, Inc. to supply supermini-type fault-tolerant CPUs, which IBM quickly whipped into the System/88. Dedicated 3090s used in conjunction with System/88s, could make a handsome addition to IBM's transaction processing effort and possibly cause some real headaches for executives at Tandem Computers, Inc.

■ Data base management and a swelling sea of disk drives have been growing concerns among big IBM mainframe users. It is possible that 3090 mainframes could be used as the basis of a sophisticated data base machine in the tradition of products currently offered by Britton-Lee, Inc. and Teradata Corp. IBM is rumored to have dabbled already in data base machine design but has held back announcing a product for fear of taking a beating on its own mainframe and disk drive sales.

■ With the spiraling demand for communications capabilities, a 3090-powered communications controller would be an impressive product for serious communications shops. Some industry observers felt IBM would significantly enhance its 3705 communications controller with a very powerful replacement. But when IBM finally enhanced the 3705 with the 3725, the new controller's capabilities fell far short of some observers' expectations. A 3090-based controller would certainly fill some high hopes for a big communications controller.

■ Judging by recent product announcements for its System/36 and 8100, it is clear that IBM is still hot on the idea of distributed data processing (DDP). A 3090 would make a fine file server in a large distributed network, but would probably further confound IBM's already confused DDP strategy.

Possibilities for washed-up 3090s

There are clearly possibilities for what appear to be washed-up 3090 mainframes. But does IBM really want to refocus the machine? Unless 3090s were used in a way that would preclude field-installed machines from being retrofitted, IBM would probably wind up bolstering the used market for 3090s and not providing much incentive for new sales — not a very appealing scenario for profit-hungry IBM. An internally retrofitted version of the 3090 for a special purpose could wind up costing more, from an R&D standpoint, than building a box from scratch with off-the-shelf components.

Still, some variation of the first possibility seems to have a plausible ring to it. The ability to use currently installed 3090s with a 3090 would fill an immediate need for IBM to do something in the scientific processing sector. It would give users who already own 3090s pause when the suggestion is made to sell the thing before it gets any older, and it would open up some doors for IBM to sell more model-to-model 3090 upgrade and memory expansion kits.

With IBM trying to play down its sometimes perceived image of periodically shafting its big systems users, some alternate use for 3090s would be an interesting olive branch for Big Blue to offer. The sketchy case for such an offering, however, does not at this point seem sufficient to warrant taking the "For sale, cheap" sign off the old 3090 just yet. But there is always hope.

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new
KODAK KOMSTAR imaging system
the start-to-finish COM

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run the Cadat software. It will be available for shipment in the fourth quarter of 1985.

The company also released an accelerator subsystem that is said to enhance the performance of its Fast-Mask Engine. The accelerator — based on the Motorola, Inc. 68020 processor — is said to allow the engine to verify the layout of integrated circuit designs up to 10 times faster than software.

The Fast-Mask system, running without the accelerator, took 9 hours to run design rule checks on a customized integrated circuit design with 40,000 transistors, a spokesman said. When the system was used with the accelerator, the time to run design rule checks was reduced to one hour and 10 minutes.

Each board in the accelerator subsystem contains 1M byte of random-access memory. A Fast-Mask Engine can reportedly be upgraded on-site by inserting the subsystem into the engine's cabinet. No changes to the user's programs are required.

The accelerator enhancement costs approximately $45,000, and it will be available in the third quarter of 1985.

More information can be obtained from Silicon Solutions at 1360 Willow Road, Menlo Park, Calif. 94025.

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COMPUTER INDUSTRY

The odyssey of the Microvax II

By Clinton Wilder
CW Staff

HUDSON, Mass. — Several small conference room doors in Digital Equipment Corp.'s semiconductor engineering facility here carry signs saying things like "Gigantic Beanstalk" and "Troll Room." The names are the work of DEC corporate consultant Bob Supnik, a devotee of the computer game "Adventure." Back in the days when he was translating the game into a version for the DEC PDP-11, Supnik decided to rename the rooms after Adventure's more interesting pratfalls.

But for most of the last three years, Supnik and his colleagues have been part of a different kind of adventure. Supnik headed the design team for the 32-bit chip set that drives the Microvax II, the recently unveiled supermicrocomputer that DEC claims has brought VAX-11/780 supermini power to the desktop.

"We had in our minds something that would set the world on fire," Supnik said during a recent interview in the appropriately christened "Treasure Vault" room. "We certainly still think it will."

The odyssey of Microvax II is the story of ambitious computer engineers who enthusiastically bit off more than they could chew and ultimately proved they could digest it. The result was a machine that DEC President Ken Olsen has called "the most exciting, and in many ways, the most significant, product [DEC] has ever developed."

The Microvax journey began quite fitfully in the summer of 1982, after DEC had consulted several external semiconductor vendors on their development cycle estimates for encoding the complex VAX architecture on a thumbnail-size chip. Some people didn't like the answers they were getting, especially Supnik. The memory still arouses the professional pride of the eight-year DEC veteran.

"If we hadn't decided we would make the chip ourselves, they'd be debugging the first pass just about now," he said. "I was absolutely incensed — here were these outsiders telling us how we couldn't get the thing to market in less than 36 months, and some of our people accepted the prognosis.

"I just reached a point where I said it can be done, and I will do it," Supnik continued, tapping his fist lightly but firmly on a table. "And in the great DEC tradition, he who proposes, does."

While Supnik assembled his Microvax chip and floating-point coprocessor chip design teams here, Jesse Lipcon, senior corporate engineer, mustered troops to develop the machine itself at DEC corporate headquarters in nearby Maynard, Mass. All told, less than 40 employees were assigned full-time to the ambitious project.

"We wanted a lean-and-mean team

See SUPNIK page 106

Chip-dumping debate heats up

By Kathleen Burton
CW West Coast Bureau

MENLO PARK, Calif. — Allegations of dumping are being hotly disputed in the semiconductor industry these days.

The industry has been reeling from an 80% price drop in 64K-byte and 256K-byte dynamic random-access memory (RAM) products since last August. Now, U.S. and Japanese chip manufacturers are locked in a debate over how those price cuts are justified.

ANALYSIS

Japanese manufacturers say that efficient production methods and high yields are the key to their lower costs, and that U.S. manufacturers have sparked recent price wars. But U.S. manufacturers claim that the Japanese are the culprits, and a recent petition by Boise, Idaho-based Micron Technology, Inc. asked the U.S. Department of Commerce and the U.S. International Trade Commission (ITC) to arbitrate [CW, July 8].

But some U.S. analysts are unconvinced. "The recent chip-dumping charges are clearly a way for U.S. manufacturers to point a finger during an industry downturn," said Ken McKenzie, a semiconductor analyst at Dataquest, Inc., a San Jose, Calif.-based market research firm. According to McKenzie, selling chips below cost is a common business practice in the industry.

"There's nothing illegal about Japan's chip manufacturers attempting to move inventory at any price, even below cost. Everybody does it," McKenzie said. It is the only strategic decision the Japanese could make; given their ramped-up capacity and today's competitive market conditions, he said.

Representatives from Fujitsu Ltd., Matsushita Electric Corp., Hitachi Ltd. and NEC Corp. claim they are not selling products in the U.S. for less than fair value. They say they can afford to sell more

See DUMP page 117

Court ponders racketeering

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Does a vendor qualify as a racketeering organization and become criminally liable under federal law if it is found guilty in civil cases of defrauding its customers?

That question now faces the 9th U.S. Circuit Court as it ponders a $5.12 million lawsuit that a user in Oklahoma has brought against Burroughs Corp. and a Dallas-based software supplier.

How the court ultimately decides the question may go a long way toward determining how much legal latitude disgruntled users will have in accusing vendors of engaging in racketeering enterprises.

The issue of how strictly federal courts should apply a controversial antiracketeering law lies at the heart of a lawsuit

See RACKET page 116

■ Tandon recently announced it had settled patent infringement claims lodged against Sony, and that it will now work on joint development efforts with the Japanese electronics firm 108

■ Intelogic Trace is the name, and servicing equipment is the game as Datapoint moves to fulfill its previously stated intention to spin off its service operations into a new company that will then acquire similar operations of Mohawk Data Sciences 107

■ The computer industry sales slump will apparently not bypass vendors of computer-aided engineering systems; two vendors in this formerly profitable niche recently announced lowered expectations/110

Slump spurs industry wars

INDUSTRY INSIGHT
Peter Bartolik
CW Senior Editor

One year ago, NCC '84 keynote speaker John Akers, president of IBM, delivered a backhanded rebuke to the media, which he claimed fails to understand the competitive process in the computer industry. The image of the industry as projected through the media, he said, "too often seems to be that of a battlefield, a place of cutthroat competition."

A year later, the industry is down in the dumps, and cutthroat competition is the order of the day.

Not only are U.S. vendors at each others' throats, they are also, to varying degrees, pointing fingers of blame at foreign competitors.

Although few realized it last summer, the semiconductor industry was already on the fast downward track toward a deep depression. Much of the blame has centered on allegations of dumping by Japanese chip manufacturers. But one outstanding fact is that the demand for personal computers was vastly overestimated, and the semiconductor industry, on a worldwide basis, greatly overexpended on new capacity.

The micro disk drive industry was embroiled in controversy last year; and part of the blame can be laid right at the door of IBM. With Big Blue churning out huge num-

See WARS page 114

DEC continues patent suits; files against Emulex for infringement

CONCORD, N.H. — Digital Equipment Corp. recently filed another in a series of recent patent infringement suits against peripheral vendors, charging that Emulex Corp. of Costa Mesa, Calif., used proprietary DEC technology in its DEC-compatible disk controllers.

The suit, filed July 5 in U.S. District Court here, seeks treble damages based on profits DEC allegedly lost to sales of Emulex products. DEC is also requesting an injunction barring Emulex from manufacturing, marketing, selling or distributing the cited products.

The suit charges that Emulex's disk controllers use DEC's patented MSCP port protocol or plug into DEC's patented SBI, Unibus, Q-bus and CMI buses in VAX-11, Microvax and PDP-11 minicomputer systems.

In previous suits, DEC has charged a variety of vendors with infringing upon its patents. "[The Emulex suit] demonstrates the company's long-standing policy and commitment to protect vigorously its innovations resulting from investments in research and development," DEC said in a prepared statement.

In a prepared statement of its own, Emulex said it was not aware of the DEC suit. "We have no direct knowledge of such a suit. We have no comment pending corporate counsel's review and analysis of any complaint which may have been filed," the statement said.

Emulex makes disk and tape controllers, package subsystems for DEC computers, multiplexers and add-on boards for the IBM Personal Computer.

SUPNIK from page 105

building a lean-and-mean product," Lipcon said. "I have a theory that products reflect their organizations. Big, bloated companies, like IBM, build big, bloated machines. We build distributed systems because we have a distributed engineering organization. This was a project that was not managed by managers. The company just let us clear away management and do the job."

From the beginning, Lipcon drilled his charges on the Microvax II bottom line — the clock. "We had a list of project priorities, and time to market was Nos. 1, 2 and 3," he said. "Price, performance and functionality came later. We knew [Motorola, Inc., National Semiconductor Corp., Intel Corp., Apollo Computer, Inc. and Sun Microsystems, Inc.] were clearly well along with their 32-bit architectures; we weren't arrogant enough to think we were the only ones that could do it. This revolution would happen, with or without us."

Supnik

Competition with chip makers, rather than minicomputer vendors, was a new experience for DEC, Supnik said. "Unlike computer rivals like Data General Corp., [semiconductor manufacturers] pretty much tell you what their plans are and give optimistic target dates," he said. "That absolutely sharpened the company vision and helped everyone focus on the competitive level. [Lipcon] always said we had to assume the worst-case competitive scenario."

Even with time to market as the paramount consideration, Lipcon and Supnik devoted the first two months of the project to selecting their teams. Supnik said the strength of his 30 workers — 20 on the CPU chip, 10 on the floating-point coprocessor — lay not in their glowing resumes but in their ability to rise to the occasion of Microvax II.

"It was not, surprisingly enough, a team of superstars," Supnik said. "The company didn't want to pull away all its top engineers and 'rob Peter to pay Paul.' We simply took talented, bright, enthusiastic people with track records in their areas, and almost everyone had challenges that were new," he said.

Although the Microvax team perfected the chip and brought the product to market well ahead of the original forecasts by outside vendors, the project was not without its snags. In the fall of 1983, Lipcon decided the conceptual design of the Microvax board could not be achieved on the tight project schedule.

"It was just plain too complex," he said. "But we followed what I call the Kiss rule — 'keep it simple, stupid' — and pared it back. The board simply had to be ready when [Supnik's] team finished the chip. In that sense, time to market dictated the design."

In January 1984, Lipcon went through another catharsis when he realized the design schedule of the board's gate arrays was slipping.

"We had to call for help," he said. "Our internal goal [for releasing the Microvax II] had been November 1984. We slipped a quarter or two [during the entire project development], but the competition slipped more."

In the end, however, Microvax II surprised even its designers. Only three debugging passes were required to produce the first batch of working chips. In August 1984, the loading and successful running of the Micro VMS operating system took just 3½ days.

Lipcon said that was the turning point. "I don't think anyone really thought we could do it until last fall, when we started running VMS. People had to understand that it really felt like a [VAX-11/780]. It was a marketing job to get this juggernaut rolling."

DEC chip engineers here are now running batch programs on the Microvax II resting snugly under Supnik's desk. DEC has staked the first claim in the desktop supermini market, and DEC OEMs have greeted the long-awaited Microvax II as a bridge to scores of potential new customers (see

Lipcon

story below).

And while DEC's chip foundry here cranks out 32-bit Microvax 78032 microprocessors and Microvax 78132 floating-point chips, Supnik has moved on to new challenges. He isn't even playing "Adventure" on his PDP-11 any more.

"Actually," said the designer of VAX on a chip, "I solved it years ago."

OEMs see Microvax II leveraging lower end of market

The Digital Equipment Corp. Microvax II has been touted as the leading edge of a revolution in CPU downsizing and price reduction that will make superminicomputer power accessible to an array of new users. And no one is awaiting that trend with greater anticipation than the OEMs that tailor their products to DEC VAX systems.

Several OEMs contacted by *Computerworld* agreed that the size and $18,840 entry-level price tag of the Microvax II should help expand their customer bases both within and outside of their current vertical markets.

"We're extremely excited about it," said Tony Glinkskas, director of sales and marketing of PDA Engineering, Inc., a vendor of DEC VMS-based mechanical computer-aided engineering (CAE) software in Santa Ana, Calif. "When you look at the size, power and price, you're looking at bringing computers where they've never been before. We've resisted going into the personal computer world because it takes forever to do a CAE problem [on a micro]. We need 32-bit power and to think there is now a small computer with the power and name of VAX, it's amazing."

PDA does not sell its software packaged with VAX machines, but Glinkskas sees PDA's sales to smaller users expanding if DEC successfully markets the Microvax II to those customers. "It's pretty easy for a smaller engineering company to justify a real engineering tool for the price of a new car or van," he said. "For firms that have been using our software on a [VAX-11/780], the problem is sharing the system with 12 other people. These people want their own little machine."

Glinkskas said the portability of the Microvax II will make his sales calls easier. "I'll put it in the back of a station wagon and take it on [demonstrations]," he said.

According to Les Lazar, president of Zoltech Corp. in Van Nuys, Calif., "customers are coming in from the cold" with inquiries about Zoltech's turnkey computer-aided electronic drafting systems with Microvax II CPUs. "These are people from outside the DEC world, educational users and smaller manufacturers just now looking at some kind of computer facility," Lazar said. "These people had been interested in VAX but could never justify it before at the price. We emphasize [DEC] Q-bus systems — Microvax II allows us to get into the VAX world where previously we were just in the [DEC] PDP-11 [world]."

Most OEMs anticipate a downward expansion within their vertical niches as a result of the new supermicro. "The Microvax II won't bring a new set of customers but a new size of firm," said Bill Payne Jr., manager of systems marketing at Huntsville, Ala.-based Intergraph Corp., a seller of turnkey architectural and electronic computer-aided design systems. "For several years, the trend has been to a reduction in physical size while keeping the same performance. I think that trend will continue."

Computer industry analysts have generally agreed that the Microvax II should boost DEC's OEM and direct sales. But many believe those sales will come at the expense of older DEC VAX products, as buyers shy away from the larger, more expensive minis.

"The VAX-11/730, 750 and 780 are now far off the price/performance slope of today's technology, and the appeal of these machines is now open to serious question," said a recent industry report from International Data Corp., a market research firm in Framingham, Mass. "Until DEC comes up with an aggressively priced two to three [millions of instructions per second] VAX product, system sales in the $100,000 to $400,000 range may falter."

— Clinton Wilder

Disk makers reach accord in patent suit

CHATSWORTH, Calif. — Tandon Corp. and Sony Corp. recently announced the settlement of Tandon's patent infringement suit against Sony, and the two companies also announced plans to develop disk drive products jointly.

Under the terms of the settlement, Sony will pay Tandon an undisclosed amount, including royalties for Sony's sales of 3½-in., double-sided disk drives that allegedly used proprietary Tandon technology. Sony also agreed to allow Tandon the option of using Sony technology in its 3½-in. drives.

In suits filed before the U.S. International Trade Commission (ITC) and a federal court in Los Angeles, Tandon had sought to block U.S. sales of disk drives from Sony and two other Japanese vendors that allegedly infringed on Tandon patents. Tandon's suits against Mitsubishi Corp. and Teac Corp. are still pending, with an ITC hearing scheduled for Aug. 19. Tandon attorney Ray Lupo declined to comment on potential discussions for out-of-court settlements with Mitsubishi and Teac.

Lupo said Sony and Tandon would work jointly to develop a 3½-in. double-sided disk drive with a capacity of more than 1M byte. "The product will be based on technology from both companies," Lupo said.

A favorable May 30 ruling by administrative law judge Sidney Harris in the first phase of the ITC hearing on the patent infringement suit [CW, June 10] spurred negotiations for the recent settlement, Lupo said. "Both companies are very pleased with the settlement," he said.

Lotus files copyright suit against Oregon publisher

BOSTON — Lotus Development Corp. recently announced it has filed a copyright infringement suit against a Portland, Ore.-based publishing company that sells user manuals dealing with Lotus software programs.

Publisher Bob Miller, chief executive officer of Management Information Source, Inc., denied that his company's publications, *The Manual: 1-2-3* and *The Manual: Symphony*, violated any copyrights.

Miller was not surprised by the suit, and in fact, his company has in recent weeks bought advertising space to promote what it describes in the advertisement as, "The book Lotus wants stopped."

Lotus charged that the publications "plagiarize extensively from the text of both Lotus training manuals," and the company has asked for a permanent injunction to halt distribution of Management Information Source's books.

Miller said he was surprised that Lotus announced the suit because it was filed more than two weeks before the announcement and included a request to bar Miller from talking about the dispute.

Lotus, according to Miller, has a weak case because the organization of his manuals is different from the manuals that Lotus provides with its software packages. Miller said his company made a nonfinancial settlement offer to Lotus prior to the announcement and has not received an answer.

Miller said he offered a settlement because of the expense in fighting a copyright battle.

Lotus has aggressively pursued copyright charges in the past year, obtaining injunctions or consent orders against three companies that it charged had copied the actual software.

Most recently, Lotus said Mueller Co. of Decatur, Ill., agreed to a settlement that acknowledged that a Mueller employee duplicated and distributed Lotus software, but that prior to the December 1984 filing of the suit, Mueller management had discovered the problem and taken corrective measures.

Datapoint OKs separate service firm

SAN ANTONIO — The board of directors of Datapoint Corp. recently approved the previously announced conversion of the company's U.S. customer service division into a separate corporate entity.

The new public company, Intelogic Trace, Inc., will be fully owned by Datapoint shareholders. Current stockholders will receive one share of the subsidiary for each share of Datapoint common stock owned; previously released plans call for the new operation to absorb the service division of Mohawk Data Sciences Corp. The new company will represent all the assets and business of the domestic service organization.

The reorganization is subject to a favorable ruling from the Internal Revenue Service or corporate counsel's opinion that the move is free from taxation. The record and distribution date for the spin-off will be announced by Datapoint in the near future.

John Hale, former executive vice-president of Datapoint, was named president of the new company. Datapoint Chairman Asher B. Edelman was named chairman of the new company.

Intelogic Trace, according to statements mailed to shareholders, will commence operations with about 2,000 employees, assets of $76.1 million and liabilities of $26.7 million. Revenue of the service operation for the nine months ended April 27 was $118.6 million.

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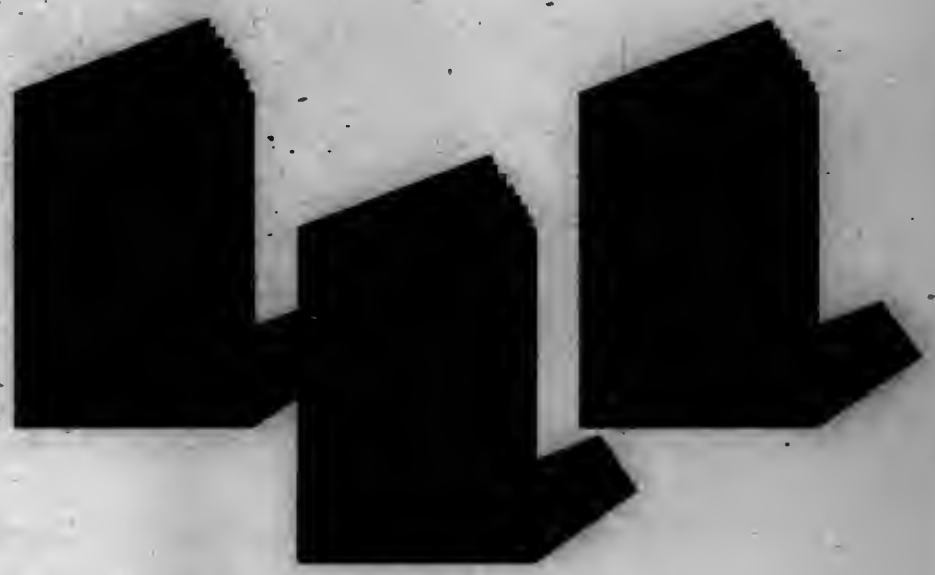

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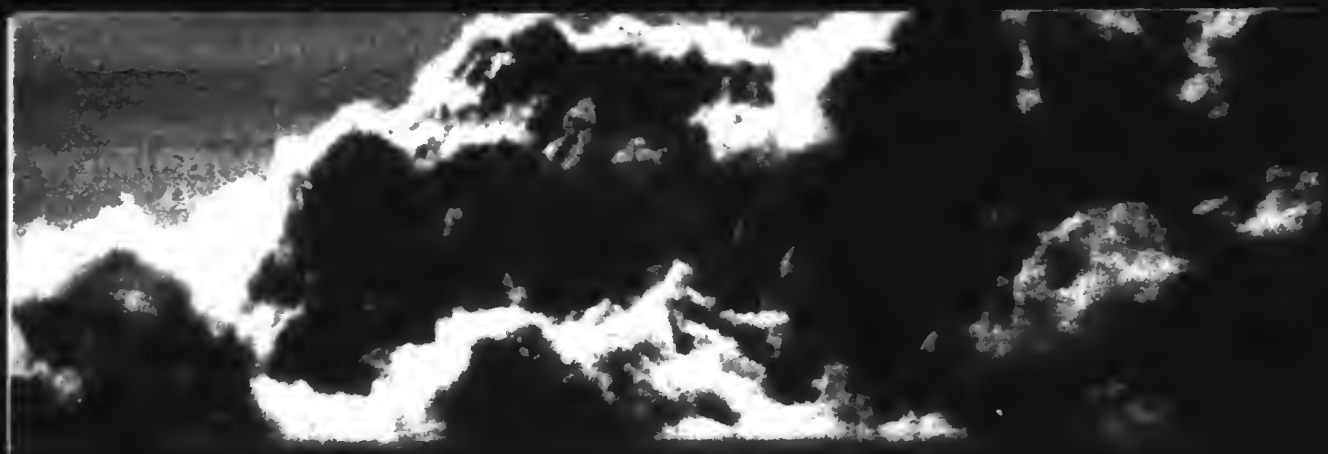

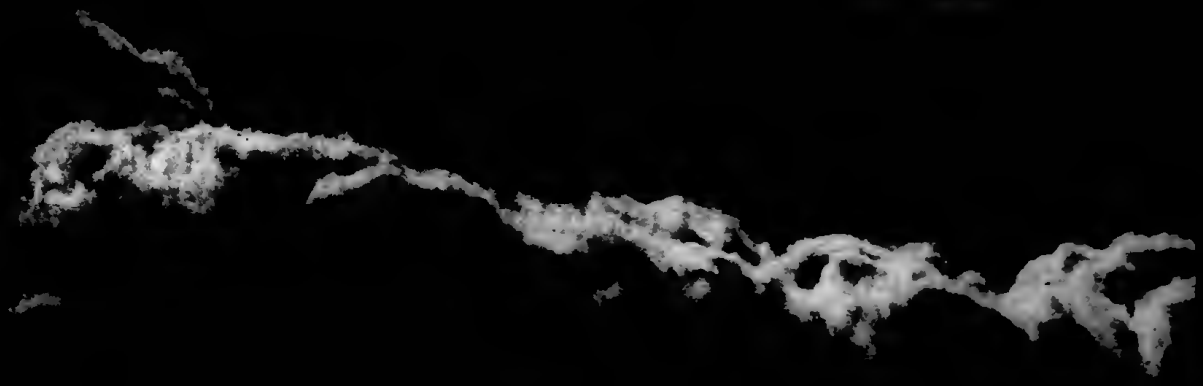

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CONTROL DATA

Xebec plans plant closing, consolidation

SAN JOSE, Calif. — Disk drive manufacturer Xebec, Inc. said recently it will close one plant and consolidate other operations due to an expected loss for the quarter ended June 30.

The company said that worldwide net sales for the quarter just ended were about 30% below the previous quarter's sales, which were $45 million.

The decline was due to a softening of demand and changes in customer demand, Xebec said.

Cost-cutting measures being implemented by the company include the closing of the Xebec East manufacturing facility in Pennsylvania and the consolidation of the operations of two subsidiaries, Information Memories Corp. and Dastek.

Another cost-saving step will be the elimination of two corporate vice-presidential functions, Xebec said.

Additionally, the company said it is considering possible write-downs. These include reserves for shutdown costs of certain facilities, write-downs of fixed assets and intangibles acquired from Datapoint Corp. and adjustment of inventories.

Sperry to resell TI system as part of planned AI line

BLUE BELL, Penn. — Sperry Corp. recently announced it signed a three-year contract to purchase Texas Instruments, Inc. Explorer systems to be resold as part of Sperry's Knowledge System product line.

Sperry said it will probably purchase more than $42 million of the TI hardware and software systems over the life of the contact.

The workstation is the first of a planned line of artificial intelligence/expert system products that Sperry intends to offer. Sperry said it will market the workstation with Knowledge Engineering Environment software developed by Intellicorp.

"Artificial intelligence and expert systems are the next echelon in computer evolution and offer dramatic opportunities, especially for a systems-based company like Sperry," said Larry L. Walker, director of Sperry's Knowledge Systems Center in Bloomington, Minn.

The company said it is currently developing 26 expert systems environments and employs more than 150 people working to make commercially viable expert systems products.

Slump spreads to CAE mart

SAN JOSE, Calif. — Two vendors of computer-aided engineering (CAE) systems recently indicated that the slump in computer systems sales has spread to dampen one of the fastest growing market niches.

Valid Logic Systems, Inc., headquartered here, said it laid off about 40 employees from its work force and has scheduled a two-week production shutdown during August.

Mentor Graphics Corp., based in Beavertown, Ore., said it expects second-quarter results to show no growth in profits over the year-earlier period. The company expects sales to be about the same as those in the first quarter of this year.

Both companies cited slow spending rates by customers. "Our customers' business is soft right now, [and] that softness is reflected in Valid's current order rate," said Jared Anderson, chairman of Valid Logic. Anderson said the company will remain profitable but that second-quarter revenue is expected to show no increase over the first quarter.

Trilogy, Elxsi sign merger agreement

CUPERTINO, Calif. — Trilogy Ltd. and Elxsi International recently announced they had signed a definitive merger agreement, formalizing an earlier agreement in principle.

Under the terms of the agreement, Trilogy will issue or reserve for issuance approximately 38 million shares of Trilogy stock to Elxsi security holders. The agreement is subject to approval by Elxsi shareholders and certain regulatory approvals and would provide Elxsi shareholders with slightly less than 50% of the outstanding shares in Trilogy.

Elxsi will operate as a wholly owned subsidiary of Trilogy when the merger is consummated.

In addition, Trilogy said it has agreed to advance certain loans to Elxsi pending completion of the merger, which is expected within three months. Trilogy advanced $5 million to Elxsi in March.

Elxsi is a privately held manufacturer of multiprocessor computer systems designed for engineering and scientific applications. Trilogy was founded by Gene Amdahl to develop wafer-scale integration semiconductors and a large-scale IBM-compatible computer.

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Let's say you're in financial services or any other industry which undergoes sudden, often hectic changes. Maybe even emergencies. To ensure that your communications link with your clients is protected, you must be able to move fast. And with 800 Command Routing, you can.

800 CALL ALLOCATOR.

Lets you direct calls to two or more call-answering locations by determining the percentage of calls each location should receive.

For instance, if you're an airline, hotel, or any other company involved in the travel business,

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Bell Atlantic subsidiary signs leasing pact

PARAMUS, N.J. — Tricontinental Leasing Corp., a subsidiary of Bell Atlantic Corp., recently signed a $100 million joint venture agreement with Forsythe/McArthur Associates, Inc., a privately held computer leasing company headquartered in Skokie, Ill.

The move marks the first venture by the Bell Atlantic subsidiary to gain a share of the lucrative third-party market for IBM mainframe computers and peripherals.

Richard A. Forsythe, president of Forsythe/McArthur, said his firm will provide the marketing and administrative services in the venture and that Tricontinental will provide the financing. The company is regarded as one of the largest privately held companies involved in leasing IBM equipment.

Holding title to 10,000 IBM units

Forsythe/McArthur is currently holding title to approximately 10,000 large IBM computers. It operates from seven regional offices in the U.S.

According to Forsythe, the firm "needed financial muscle" to expand operations in leases involving top-of-the-line IBM 3080 series and the new 3090 mainframes and peripheral equipment.

The Illinois firm will write the leases financed by the venture, and Tricontinental will take title to the equipment through a purchase leaseback arrangement.

ITC as impetus

Forsythe said the impetus for the agreement is the federal Investment Tax Credit (ITC) that will accrue to Tricontinental.

If the U.S. Congress members approve President Reagan's tax reform proposal, and it eliminates the ITC, Forsythe said, "it would dramatically impact if not eliminate the venture."

However, Forsythe noted, "We seem to have lost a little steam for tax reform," and it now appears unlikely that the proposal will be approved before January.

Cipher Data cuts work force

SAN DIEGO — Storage tape drive manufacturer Cipher Data Products, Inc. recently announced cost-cutting measures, including a reduction of its domestic work force by about 13%.

Don M. Muller, chairman, president and chief executive officer, said the sluggishness of the U.S. economy and the minicomputer industry prompted the move.

"It's our view that the economic conditions and current industry slowdown will be with us for several more months, and these actions are appropriate to prevent further erosion to fiscal 1986 financial expectations," Muller said.

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bers of desktop devices, it has doled out contracts that could more than double the production runs of some small manufacturers. And just as quickly as it blessed these essentially one-product vendors, IBM could cave in the ceiling by canceling and taking its benefits elsewhere.

Although it is unclear whether the strength of the U.S. dollar or a cutback in consumption caused the slump, it does seem certain that IBM's unabated flood of products has not eased the problem. Just ask Wang Laboratories, Inc. if cutthroat competition is loose in the land.

Take personal computers . . . please! We all know what happened to those vendors foolish enough to believe that they could build on a supposed industry standard. IBM is more than happy to see the entire industry dependent on Microsoft, Inc.'s MS-DOS operating system, but developing a standard I/O system to massage the software brings lawsuits from IBM.

So now that every personal computer is tied to the whims of IBM, the elephant has everyone scared that it really can dance. With the large variety of IBM Personal Computer versions already out, rumors are emanating that PC2 is going to change the rules.

Well, even IBM is not immune to the problems that are plaguing all other players in the industry. No longer propped up by rental income, IBM is facing problems of foreign competition, a strong dollar and weakened demand. It shelved the PCjr, saw the Sierra cut into 3080 series sales and has watched the demand for departmental processing systems dry up.

But IBM is big enough to weather any storm. It can cut equipment prices to the bone and raise the rental fees on software. IBM can ride out a year of adversity because it knows it will be around to catch the next wave of prosperity. A lot of others don't have that kind of cushion.

The innately skeptical might be excused if they think that IBM is not unhappy to see the playing board cleared of some clutter. Some open spaces might give IBM a little more room to position its chess pieces more tightly around AT&T's king. These skeptics might think not that the role of competition is overplayed, but rather that the media is too much in awe of the emperor's new clothes.

HOW WE'RE RUNNING CIRCLES AROUND HAWORTH, STEELCASE AND HERMAN MILLER.

When it comes to planning an office environment; you probably think about work spaces in terms of squares and rectangles. In other words, shapes with 90 degree corners. Up until now, this way of thinking seemed natural and correct. Since most rooms, desks and office furniture had familiar right-angles, these shapes appeared to work...pretty well. The time has come, however, to change your thinking about space planning by considering another familiar shape... the circle. At Center Core we have used the circle to create workstations that put more people into the same space and, provide more work surface per person. These workstations offer you the simplicity of conventional desks, the privacy and attractiveness of systems furniture—plus, the flexibility and human engineered benefits of ergonomic design. The Center Core concept was the first to group up to six individual workstations around a clear space, or core. This core is extremely functional because it eliminates complicated wire management schemes. Other significant Center Core concept benefits include: Cost Efficiency. Our workstations save up to 40% in floor space and increase primary work surface up to 75% over conventional systems. Aesthetics. Our core concept eliminates visual clutter because all major wiring is out of sight. Also, a wide choice of fabric coverings and wood finishes make Center Core workstations warm and inviting. Flexibility. With our designs you get maximum utilization of available space. Our workstations can be adapted to changes in job functions without your having to buy additional components. Accessibility. With Center Core, both primary and secondary work surfaces are within easy reach. And, most overhead storage falls within the primary work area. When you think about these benefits, then you're thinking Center Core. Once you do, you will never think about conventional systems furniture again. And, that's how we're running circles around our competition. Call us for the Center Core distributor or dealer nearest you. Or, write for more information: Center Core Incorporated, 250 Corporate Court, So. Plainfield, New Jersey 07080. 1-800-433-4304.

CENTERCORE

RACKET from page 105

that Madison J. Bowers has filed against Burroughs and CCH Computax Systems, Inc., a software developer. In addition to alleging breach of contract and misrepresentation, the Tulsa-based provider of tax consulting and accounting services has accused the two defendants of violating the federal Racketeer Influenced and Corrupt Organizations (Rico) Act.

As legal justification for claiming Rico Act violations, Bowers and his San Diego-based attorney, William Woods, cited a prior complaint in which Burroughs was found to have fraudulently marketed a B series system. In Bowers' view such a judgment helps fulfill the legal requirements for prosecution under the Rico Act, which specifies at least two indictable acts of fraud or comparable offenses within 10 years, Woods said.

Both Burroughs and CCH, however, dispute the plaintiff's argument that fraud judgments in civil matters qualify as criminal violations of the Rico Act.

"As a matter of law, [Bowers' contention] is insufficient to state a claim under the Rico statutes," Burroughs attorney Albert F. Shamash said. "If the [opposing side's] theory is sustained, every time a company is involved in a civil case and a judgment is entered on a fraud cause of action, the defendant can somehow be construed as engaging in a racketeering activity. So far as I know, no court has interpreted [the Rico Act] to that extent."

As to the issue of which interpretation of the Rico Act — Bowers' or Burroughs' — is correct, the law itself provides no clear-cut answers. The Act's language, particularly its use of the ambiguous phrase "indictable acts," raises questions about how broadly racketeering statutes were meant to be applied.

Burroughs, through its legal counsel, interprets the law quite narrowly and takes indictable acts to mean convictions. Such a reading would preclude an aggrieved buyer from using prior civil judgments as a basis for suing a vendor under the Rico Act.

Liberal interpretation of law

Bowers, by contrast, has adopted a comparatively liberal interpretation of the federal law and wants Rico Act applicability widened to include any prosecutable fraud, Woods said.

Because both Bowers and Burroughs can cite judicial precedents to support their respective viewpoints, neither interpretation of the Rico Act is universally recognized as valid.

The legal community had been anticipating a definitive ruling this year from the U.S. Supreme Court on the applicability of the Rico statute to business fraud. Lawyers who oppose such application have argued that Congress drafted the law to penalize organized crime elements and that the spreading use of Rico Act claims to win triple damages awards from legitimate business enterprises is too broad an interpretation of the law. The Supreme Court early this month rejected limits set last year by a federal appeals court in New York and instead said it is up to Congress to set any limitations.

So for the time being, the battle to clarify the Rico Act's exact meaning and scope will continue to be fought at the U.S. circuit court level.

As expected, Bowers and Burroughs differ sharply in their opinion of how the outcome of their legal dispute will affect similar cases in the future. If the 9th U. S. Circuit Court sides with Bowers and interprets the Rico Act broadly, "computer companies and other companies will find themselves facing these kinds of racketeering allegations more often," Shamash predicted.

Woods, on the other hand, foresees just the opposite effect. A 9th Circuit endorsement of his liberal Rico Act theory would enable federal courts to clear their dockets by creating a legal basis for dismissing all racketeering claims that are unsupported by at least two prior judgments for fraud. At a time when Rico Act allegations are becoming pandemic, many courts are increasingly trying to rid themselves of frivolous racketeering cases, Woods said.

Except for its unusual interpretation of the Rico Act, Bowers' legal action is almost indistinguishable from a thousand other customer complaints against vendors: During a recent phone interview, Bowers accused Burroughs and CCH of working together to sell him a B92-based accounting system that they knew would be inadequate for his needs.

Asked to respond to the charge, Shamash absolved Burroughs' hardware of any responsibility for Bowers' alleged problems and denied the existence of a formal marketing arrangement with CCH.

Phaser seeks debt shelter

SAN FRANCISCO — Phaser Systems, Inc., a microcomputer software development company, recently filed for protection from creditors under Chapter 11 of the U.S. Bankruptcy Act.

Phaser, a developer of business-oriented software systems, reported assets of $425,831 and debts of almost $2 million.

The company is publicly held and has about 480 shareholders.

Phaser said its principal assets are software products designed to enhance programmer productivity and enable micro-mainframe networking.

The company said it hopes to file a plan for reorganization that will permit further product development and sales.

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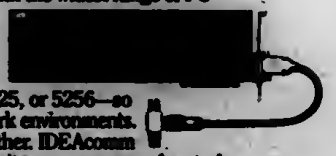

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COMPUTER INDUSTRY

Sales and Earnings

Monitor Graphics Corp. reported revenue for the first quarter ended March 31 of $32.3 million, compared with $14.5 million in the comparable period a year ago. Profits were $2 million, or 22 cents per share, compared with $1.5 million, or 12 cents per share, in the first quarter one year ago.

■

Western Digital Corp. announced revenue for the third quarter ended March 31 of $40.7 million, compared with $27.5 million a year ago. Profits were $2.1 million, or 16 cents per share, compared with $1.7 million, or 11 cents per share, in the same quarter one year ago.

■

Xidex Corp. reported revenue for the three months ended March 31 of $72.4 million, compared with $46.5 million in the same quarter last year. Profits were $5 million, or 16 cents per share, compared with $7.3 million, or 31 cents per share, in the same period a year ago.

■

Bantek Corp. announced revenue for the third quarter ended March 31 of $12.3 million, compared with $6.8 million in the comparable period a year ago. The company reported a net income of $165,000, or 5 cents per share, compared with a net loss of $476,000, or 26 cents per share, in the like period last year.

■

Altos Computer Systems, Inc. reported revenue for the third quarter ended March 30 of $30.7 million, compared with $28.9 million one year ago. Profits were $2.7 million, or 18 cents per share, down from $3 million, or 20 cents per share, in the like quarter a year ago.

■

Computer Task Group, Inc. announced revenue for the first quarter ended March 31 of $26 million, a 50% increase compared with $17.3 million in the like period a year ago. Profits were $773,000, or 26 cents per share, compared with $337,000, or 17 cents per share, in the same period a year ago.

■

BBC Systems Corp. announced revenue for the quarter ended March 26 of $37.9 million, compared with $34.7 million for the same period a year ago. Profits were $2.2 million, or 15 cents per share, compared with $3 million, or 20 cents per share, for the same quarter in the previous year.

■

Automatic Data Processing, Inc. announced revenue for the third quarter ended March 31 of $273.5 million, compared with $234.9 million a year ago. Profits were $26.1 million, or 73 cents per share, compared with $2.1 million, or 65 cents per share, reported one year ago.

■

Applied Data Research, Inc. reported revenue for the three months ended March 31 of $34.3 million, up 50% from $21.5 million in the same period a year earlier. Profits were $568,000, or 10 cents per share, compared with $238,000, or 6 cents per share, in the corresponding period last year.

DUMP from page 105

cheaply than U.S. chip vendors because of more efficient production methods and higher yield rates.

"Micron has no facts," asserted Ken Shimba, a spokesman for Matsushita. "We always pay attention to dumping margins and set the U.S. prices at a higher level than our domestic prices," he said.

According to Harry McGrath, a spokesman for Hitachi, Micron is trying to scapegoat the Japanese because its own business strategy has backfired. Micron is seriously undercapitalized and cannot compete against Japanese conglomerates and other semiconductor giants, he said.

U.S. chip makers' responses

Predictably, U.S. chip makers disagree. "When prices drop 50% to 50% in six months' time, you know there's more at work than normal cost declines," said Larry Grant, general counsel for Micron. According to Grant, the Japanese are dumping memory chips here to gain market share and discourage Korean manufacturers from entering the fray.

Grant denied that Micron led the price wars. Although the company cut its 64K-byte dynamic RAM prices from $2.50 to $1.95 last fall, prices have plummeted since then. Now, 64K-byte products are selling at 50 cents to 75 cents, and the Japanese are to blame, he said.

The dumping allegations will be difficult to prove, said Sheila Sandow, an analyst with the Semiconductor Industry Association, a trade organization in Cupertino, Calif. The Japanese cost of chip production is not publicly available. And even with a cost model being put together by the Commerce Department, yields and volume are still difficult to compute because the Japanese are vertically integrated and often recycle chips internally, Sandow said.

According to Sandow, the real problem is Japan's protected chip market. The Japanese increased capacity 50% over the past eight months, resulting in a surge in exports to the U.S., predatory pricing and dumping, she said.

Ultimately, the Commerce Department and the ITC may have to choose between limiting foreign companies' business ventures in the U.S. or sacrificing U.S. semiconductor profits. If it comes down to tariffs, quotas and other protectionist policies, it could open a no-holds-barred trade war where nobody wins.

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CW International Marketing Services
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If the space program had advanced as fast as the computer industry, this might be the view from your office.

And space stations, Martian colonies, and interstellar probes might already be commonplace. Does that sound outlandish? Then bear these facts in mind:

In 1946 ENIAC was the scientific marvel of the day. This computer weighed 30 tons, [illegible] covered 15,000 square [illegible] $486,840.22 in 1946 dollars. Today a $2,000 kneetop portable can add and subtract more than 20 times faster. And, by 1990, the average digital watch will have as much computing power as ENIAC.

The collective brainpower of the computers sold in the next two years will equal that of all the computers sold from the beginning to now. Four years from now it will have doubled again.

It's hard to remember that this is science fact, not fiction. How do people keep pace with change like this? That's where we come in. We're CW Communications, Inc.—the world's large[illegible] publisher of computer-related newspapers and magazines.

[illegible]

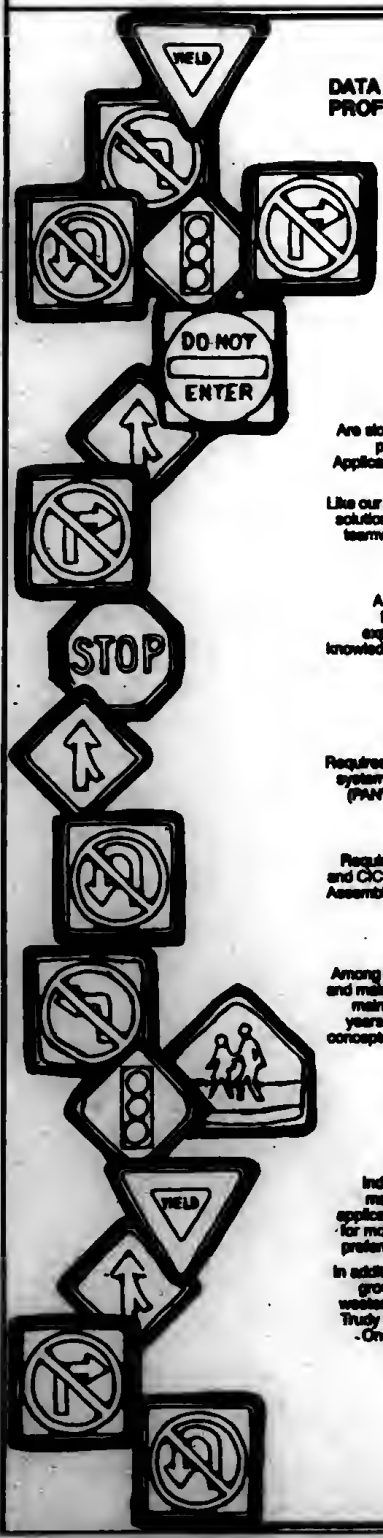
Nobody reaches a more computer-involved people around the world than we do. And nobody covers as many markets. In the United States we publish three computer/business journals: *Micro Marketworld*, for businesses selling small computers and software; *On Communications*, the monthly publication covering the evolving communications scene. And *Computerworld*, the newsweekly for the computer community, is the largest specialized business publication of any kind in this country.

weekly

for all personal compo

The other six are monthly magazines tha

POSITION ANNOUNCEMENTS



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Are slow growth and lack of challenge at your present company blocking your talents...stepping your career growth? Then it's time to make a change. To ASA, Advanced System Applications, Inc., one of the nation's top 50 software firms and one of the few companies to nearly double in size last year through sales...not acquisitions.

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As head of the programming staff, you will schedule resources, prepare and administer budgets, prepare cost estimates, and provide technical consulting. Five or more years experience in data processing required. Experience in IMS, CICS and DL/1 is necessary; knowledge of formal life cycle approach to systems development is required. At least 1 year of management experience is a must.

SENIOR PROGRAMMER ANALYST
SENIOR SYSTEMS ANALYST

Requires a minimum of 2 years COBOL programming experience with large multi-tiered on-line systems in an IBM compatible environment. Desired experience includes: BAL; on-line editor (PANVALET, ROSCOE, TSO); group health claims or billing and membership; and OS/JCL.

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Requires expertise in DASD management, working knowledge of operating system internals and CICS/IMS plus the ability to optimize job stream processing. Experience with all phases of Assembler programming essential. Must be able to develop and maintain procedures and have the ability to communicate with technical and business personnel.

TECHNICAL SUPPORT SPECIALIST

Among your responsibilities will be on-site installation; design, coding, testing, documentation and maintenance of Assembler programs; providing technical expertise in JCL and VSAM; and maintaining CICS tables (FCT, DCT, PPT, PCT) for development systems. A minimum of 2 years Assembler programming experience is required, including experience with CICS logic concepts and problem analysis/debugging. Good communication skills and COBOL proficiency are also necessary.

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Individuals with experience in Hewlett Packard, Univac, NCR, Honeywell, and other large mainframe environments can find hands-on experience working with our IBM compatible applications. Must have 2 or more years experience designing complex COBOL applications for modular systems. Experience with complex applications such as insurance or banking is preferred. Any on-line TP monitor experience will also be considered. BAL would be helpful.

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Candidates should have three years of basic assembler language programming in the development, modification, installation and maintenance of executive software, which included one year of computer systems design and programming in a large-scale operating system. A Bachelor's Degree in Computer Science, Business Administration, Accounting or other specialized background is preferred but not required.

This challenging position presents an excellent career opportunity in a very large IBM environment that is committed to the application of leading edge technology.

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This is a Civil Service position. A job announcement and application materials may be obtained by contacting ..., Transportation Personnel, Room ..., Transportation and Safety Building, Harrisburg, PA, 17120, telephone number 717-... The required application and supplement must be filed at this address by August 2, 1985.

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Live Oak Center
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BOSTON: Robert Hansen and Co., Inc.
North Beach Park, Suite One, 181 Bedford Street
Lexington, Massachusetts 02173 (617) 861-1020

CHICAGO: Thos. Hintz & Associates
150 N. Wacker Drive, Suite 1700
Chicago, Illinois 60606 (312) 977-1055

COLUMBUS: Michael Thomas, Inc.
65 E. Wilson Bridge Road, Suite 201
Worthington, Ohio 43085 (614) 846-0825

DALLAS: DataPro Personnel Consultants
12720 Hillcrest, Suite 520
Dallas, Texas 75230 (214) 691-8000

DENVER: Abacus Consultants, Inc.
1777 South Harrison, Suite 404
Denver, Colorado 80210 (303) 759-5094

DETROIT: Electronic Systems Personnel, Inc.
3000 Town Center, Suite 2500
Southfield, Michigan 48075 (313) 353-5280

FLORIDA: Data Science Personnel, Inc.
P.O. Box 8577
Hollywood, Florida 33024 (305) 434-8112

HARTFORD: Compass, Inc.
999 Asylum Avenue
Hartford, Connecticut 06105 (203) 549-4240

HOUSTON: Career Consultants, Inc.
1980 Post Oak Boulevard, Suite 1855
Houston, Texas 77056 (713) 626-4100

INDIANAPOLIS: Career Consultants
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Indianapolis, Indiana 46204 (317) 639-5601

KANSAS CITY: D. P Career Associates
8465 Mobell, Suite 502
Shawnee Mission, Kansas 66202 (913) 236-6200

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Personnel Service
6345 Fallbrook Avenue, Suite 200
Woodland Hills, California 91367 (818) 884-3000

MILWAUKEE: EDP Consultants, Inc.
Chenshiry Park II
300 N. Sunnyslope Rd., Suite 350
Brookfield, Wisconsin 53005 (414) 797-0005

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Minneapolis, Wisconsin 55402 (612) 339-6714

NEW YORK: Data Associates, Inc.
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New York, New York 10007 (212) 227-7370

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Syracuse, New York 13206 (315) 463-5625

NORTH CAROLINA: Quintessence,
Div. of TechForce, Inc., P.O. Box 6000
Greensboro, North Carolina 27405
(919) 373-1491

PHILADELPHIA: Systems Personnel, Inc.
115 West State Street
Media, Pennsylvania 19063 (215) 565-5660

PHOENIX: Professional Career Consultants,
4725 N. Scottsdale Road, Suite 200
Scottsdale, Arizona 85251 (602) 274-0005

PITTSBURGH: Mellott, Lignon & O'Brien, Inc.
P.O. Box 366
Allison Park, Pennsylvania 15101 (412) 487-5153

SAN FRANCISCO: The Computer Resources Group,
Inc. Agency, 300 Sacramento Street
San Francisco, California 94111 (415) 398-3535

SEATTLE: Hansen, Martin, Martin & Associates
1040 110th Avenue N.E.
Bellevue, Washington 98004 (206) 453-2750

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This Division is involved in developing and producing a variety of high-performance monitoring products for IBM mainframe systems. We currently have many opportunities available for software professionals.

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Will be responsible for customer education and training as well as performance analysis, tuning, and problem resolution. Must have internal knowledge of MVS, IMS, CICS or VM. Experience in performance and tuning a must. Good communication skills required.

Systems Programmers (Los Angeles)

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Will be responsible for editing and directing the production of Candle's technical publications. Excellent editing and coordination skills required, as well as knowledge of major IBM systems, such as MVS, VM, DOS, CICS or IMS.

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INFORMATION SERVICES DIVISION

This Division is engaged in research and development related to office automation and information-center products. We have opportunities available in all areas of systems software development.

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This key position will be responsible for extending and enhancing our development tools, and contributing to our compiler-oriented R&D projects. The ideal candidate will have substantial compiler development and systems programming experience in an MVS environment. Since we have extended the C language run-time environment to achieve compatibility with Assembler and PL/I under CICS, knowledge in these areas at the internal levels is also a plus.

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We are seeking professionals at several levels to assist in the creation of a sophisticated interactive application development system. Depending on experience and career orientation, these individuals will be responsible for technical leadership, design, or programming, in company with a team of talented and highly motivated Software Engineers. The people we are seeking must have had substantial system software development experience in a variety of environments, particularly TSO, CICS and CMS, using both Assembler language and structured high-level languages such as C, PL/I or PASCAL. A strong interest in state-of-the-art user interface technologies, including object-oriented concepts is also important. Some areas of technical expertise which are especially desirable are:

- Data Communications (VTAM applications using 3270 devices)
- Database (particularly relational DBMS internals)
- Compiler development (structured HLL, 4GL)
- Programming Languages (C, OS/VS Assembler, PL/I)
- Operating Environments (MVS, TSO, CICS, CMS, ISPF)

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• As part of our Information Systems Group, you will have the opportunity to explore new technologies in transaction processing, electronic transfer, ATM applications, and office automation.

• We are interested in people who are interested in joining a winning team. And we encourage that winning team through training programs, sponsorship in professional groups, and attendance at advanced technical seminars.

• SR. TECHNICAL CONSULTANT

(#1) Will translate the Bank's applications requirements into a computing architecture which will support the Bank's future transaction loads, relational data structures and communications requirements.

We require 10+ years experience in high-level computer software design and or hardware design and development.

• SR. TECHNICAL CONSULTANT

(#2) Provide consultative services regarding multiple technical environments associated with end user computing. Will support the definition of end user EDP requirements and recommend technical solutions and integrate solutions via appropriate hardware/software configurations.

Ten years EDP experience with primary focus in end user computing and office systems networking.

• MANAGER DATA BASE

Responsible for developing strategic data planning and technical support for the Corporation, including logical data base design expertise and consulting, physical data base design, and implementation for all systems.

Ten years EDP experience with a minimum of six years in data base analysis and design, extensive experience in data administration and planning. Banking experience preferred.

• TECHNICAL CONSULTANT

Provide long range direction in the development and analysis of new technology for the Tandem interface processor environment. Will act as an internal consultant by providing highly specialized technical guidance on complex projects.

We require six to eight years EDP experience with working knowledge and ability to utilize current technology and implementation methodologies. Technical expertise in Tandem operating systems.

• MANAGER TELECOMMUNICATIONS

Responsible for managing and directing the Telecommunications Department in order to provide and support data and voice communications equipment and services for the Corporation.

Strong working knowledge in data and voice communications is normally acquired through ten years experience.

• Seattle, the cultural and business center for the Pacific Northwest, is nestled between the Cascade mountains to the east and the majestic Olympic mountains to the west. It offers a wide range of leisure activities from golf and tennis to camping, skiing, fishing, hiking and sailing. Our cultural scene is expanding new art galleries, repertory theatres, the best of broadway shows, and a great assortment of first run foreign and domestic films.

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DATA BASE ANALYST

As part of a project development team, you'll provide data base consultation and play a key role in the development of our business systems. You should have a thorough knowledge of data base and application design and be ready to put your expertise to work. We require at least 3–5 years of experience with [illegible] and/or IMS. You will need excellent communications and interpersonal skills and the ability to produce results while working under demanding deadlines. A BS in Computer Science or the equivalent in work experience is a must. Experience with [illegible], TSO, PL/I and MVS is also required. Knowledge of [illegible], ADF and [illegible] would be a plus.

Our pay for performance system rewards excellence and our benefits package reflects our status as an industry leader. Please forward your resume to: Chevron Corporation, Professional Employment Office, Dept. 85-36, P.O. Box 7137, San Francisco, CA 94120-7137. We are proud to be an equal opportunity employer. Principals only, please.

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QUILL CORPORATION

Data Processing

CT Department of Transportation [illegible]

DATA BASE ANALYST

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Software: COBOL, IMAGE, VIEW, SPL, QUIZ, QUICK, QTP, FORTRAN, IDSI, TDS, GMAP

Project Team Leader

Reporting to the Systems & Programming Manager, the Project Team Leader/Senior Analyst will have responsibility for controlling, Coordinating quality reviewing of all projects assigned to the Programming Team.

The main tasks associated with the position are:

- Assessing the feasibility and effectiveness of proposed systems
- Examining and developing alternative approaches for optimum resolution
- Developing Project specification, estimating resource requirements, time schedules & cost estimates
- Co-ordinating and controlling the activities of all team members to ensure adherence to established procedures and schedules
- Preparing and presenting project status reports on a regular basis
- Providing technical guidance to all team members
- Responsibility for training Saudi-Nationals assigned to the team

A Bachelor's Degree, combined with 8 years data processing experience, including 3 years in Systems Analysis and a minimum of one year Project Management experience in a large scale organization is required. In addition, more than 4 years experience with Hewlett-Packard equipment and must be proficient in COBOL, SPL, VIEW, IMAGE, VPLUS as well as QUICK, QTP and QUIZ.

Senior Programming Analyst

This position calls for in-depth experience with a high degree of knowledge relative to the development and on-going maintenance of application systems in a HP 3000 environment. The Senior Programmer Analyst will be responsible for designing and implementing solutions to complex application problems and the provision of technical guidance and training of other computer staff.

Should have at least 6 years experience in computer programming with high proficiency in the COBOL Language. Background should include training and experience with VIEW, IMAGE and VPLUS. Knowledge of QUIZ, QUICK and QTP would be a plus.

Programmer/Analyst

Reporting to the Project Team Leader, the Programmer Analyst will be involved in writing and testing source code according to specifications and established standards. You will also assist in preparing detailed programming specifications and related support documentation.

Must have a minimum of 3 years Hewlett-Packard experience, including COBOL, VIEW, IMAGE, VPLUS. Experience with QUICK, QUIZ and QTP would be a plus.

Clinical Laboratory Programmer/Analyst

The Clinical Laboratory Programmer/Analyst will assist in the direct support of the MEDLAB PATHLAB product.

Reporting to the Clinical Laboratory Programming Team Leader, you will be responsible for the support and modification of vendor-supplied software, bug-fixes, etc., and the coding and testing of specialized application programs, all written in the FORTRAN language.

Applicant must have minimum of 4 years data processing experience, with at least 2 years of FORTRAN programming. Experience with Clinical Laboratory systems a definite advantage.

Computer Operations Shift Leader

Responsible for a shift consisting of two operators. Candidates should have minimum of 4 years experience working with HP 3000, including at least 2 years as Senior Operator, be able to demonstrate sound supervisory experience, the ability to communicate at all levels and have indepth JCL knowledge, experience with HP 3000 utilities such as Editor, TDP, DBUTIL, Adager would be positive factor.

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To assist in operation of multi Hewlett-Packard configuration consisting of 2 HP 3000 Series 33 and Series III, operating under MPEIV and IPEV, and a CDC Cyber 18 Medlab Laboratory Computer operating under M27.

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Benefits: Tax-free salary, some married-status positions, accommodations, airfares, education allowance for approved dependents, free, fully furnished, air conditioned living accommodations, two month salary bonus on completion of initial 2-year contract, free medical care and emergency dental care, one month paid leave on completion of each 6 months of service, free air fares (including leave flights), subsidized meals, use of extensive recreational and sports facilities.

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This person will work on generation and optimization of 370 object code produced by a C compiler. This person must have in-depth knowledge of IBM 370 architecture, instruction set and object code, as well as extensive knowledge of assembler or object code level debugging on a 370 architecture mainframe under any operating system. A bachelor's degree or equivalent experience and the ability to work well with other programmers investigating suspected code problems are required. Knowledge of C is a plus.

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This person will manage the Hardware Support Department, which specifies, installs, monitors, and maintains data, voice, emergency power, and security hardware for the Data Center and SAS Institute. This person must be able to manage people with diverse technical knowledge and skills, prepare and interpret specifications, analyze bids, prepare reports, and maintain records. A degree in engineering or a related field, or the equivalent in directly related work experience is required. Applicants must have two years' experience in data processing; one year's experience in a supervisory capacity; and experience in several of the following areas: data communications, voice communications, LANs, security systems, power systems and switchgear, electronic troubleshooting, construction planning, and project management. A working knowledge of SAS software is desirable.

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This person will license SAS software to current and new sites using telemarketing. A minimal amount of travel is required. A bachelor's degree, thorough knowledge of the SAS System or related software, two years' sales experience, and excellent interpersonal skills are required. Experience with data base management systems, preferably SYSTEM 2000 DBMS, is a significant plus.

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This person will provide the marketing interface with the sales, product development, and corporate communications staffs for developing product training, sales literature, and advertisements. This person will evaluate competitive products and serve as a technical resource for the Software Sales staff. A thorough knowledge of SAS software products, the ability to work with people of various technical backgrounds, and excellent verbal and written communication skills are required. Applicants must have a BS degree and two years' experience using SAS software.

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This person will provide primary support to users with software installation, SAS supervisor-level problem investigation, I/O interface, and utility procedures usage. Applicants must have two years' extensive SAS programming experience; one year's experience in a VMS environment; knowledge of VMS DCL programming; and familiarity with VMS system quotas and parameters. A bachelor's degree and prior technical support experience are preferred. PL/I, C, and VMS macro programming experience is a plus.

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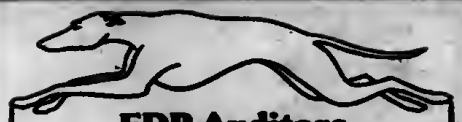

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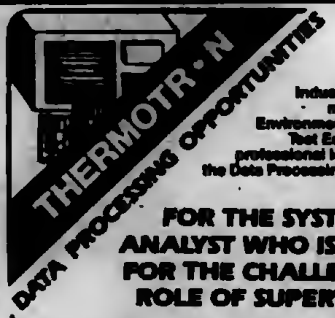

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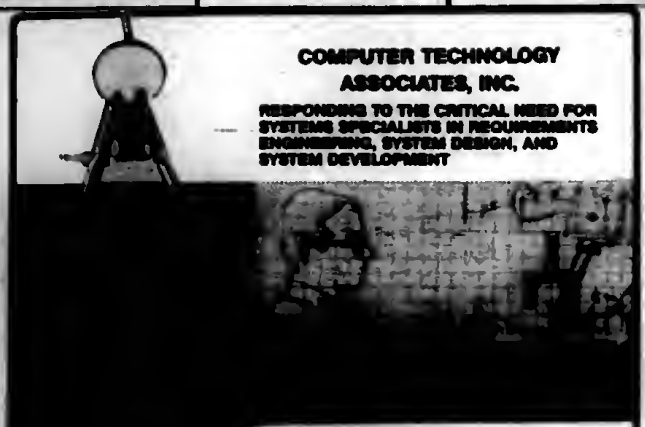

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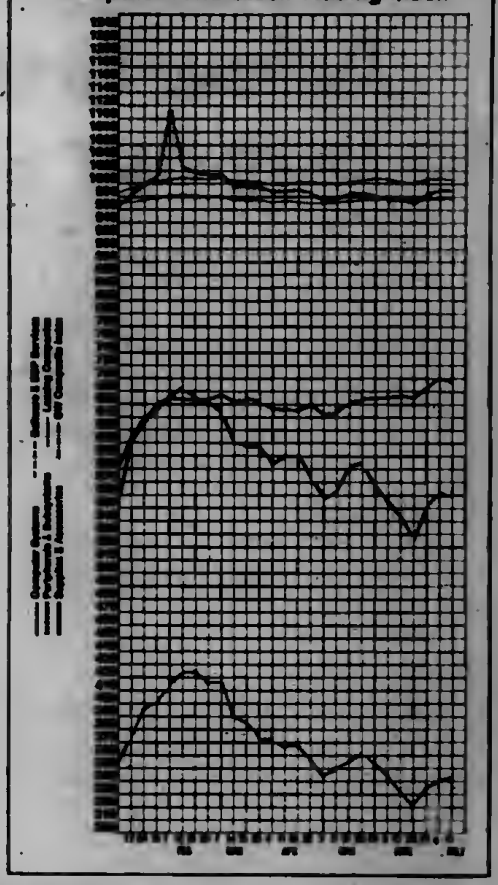

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CONFERENCE DIST. GROUP — President, William S. Lotsch.

[illegible] — Corporate Director [illegible], Jeff Cardoza, Corporate Systems Manager, Thomas Pike.

Representative to purchase on [illegible] Industry Directories, National Data Corp., [illegible] Rd., Los Altos, Calif. [illegible]. Phone: (415) 701-[illegible]. Computerworld [illegible] with a Cochituate Sub. [illegible]

Computerworld Stock Trading Summary

[illegible], JULY 15, [illegible]

All statistics compiled computed and formatted by TRADE QUOTES INC Cambridge, Mass. 02139

[illegible]

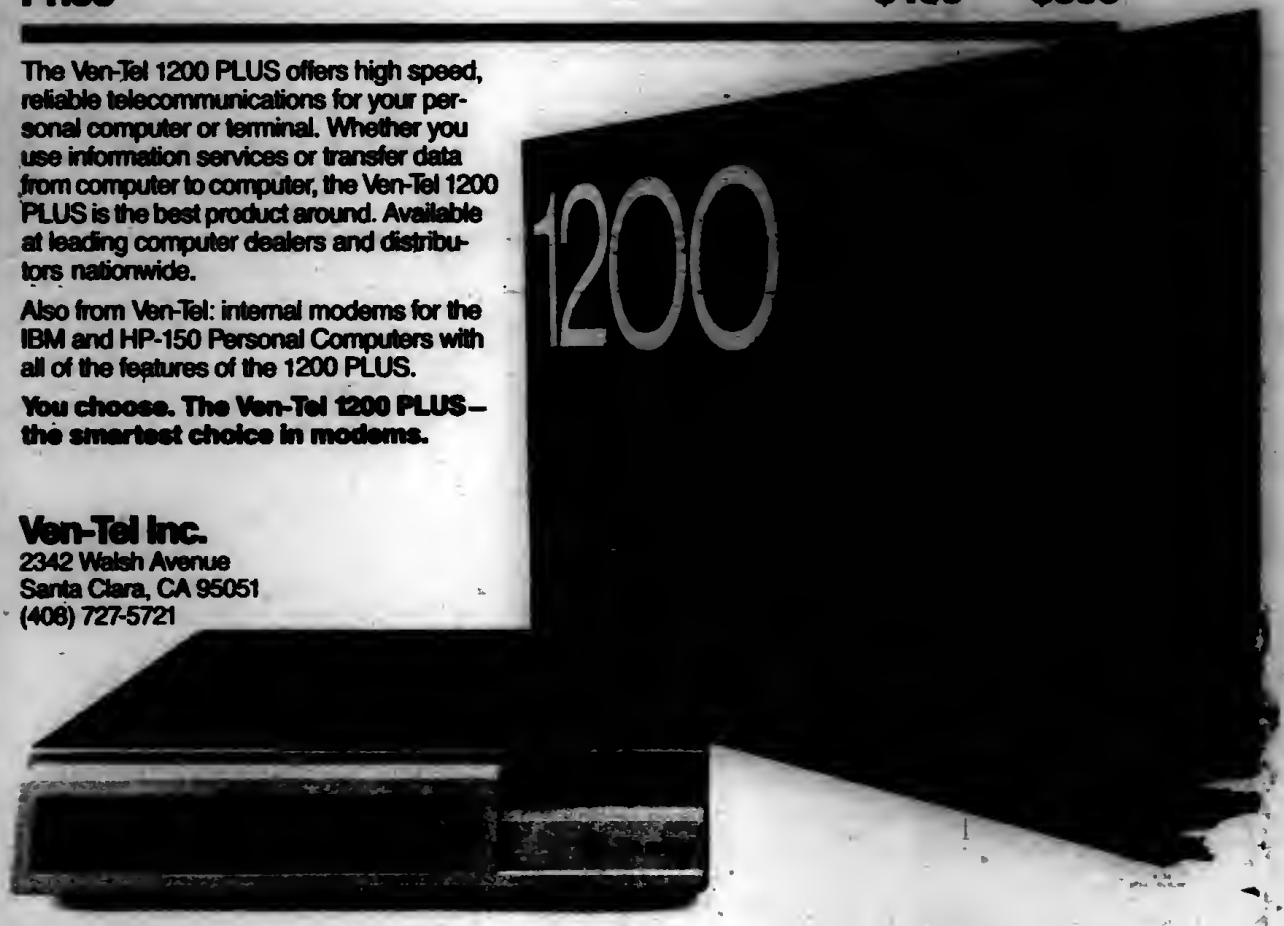
A few smart reasons to buy our smart modem:

Features	Ven-Tel 1200 PLUS	Hayes
1200 and 300 baud, auto-dial, auto-answer	Yes	Yes
Compatible with "AT" command set	Yes	Yes
Can be used with CROSSTALK-XVI or Smartcom II software	Yes	Yes
Regulated DC power pack for cool, reliable operation	Yes	**No**
Eight indicator lights to display modem status	Yes	Yes
Speaker to monitor call progress	Yes	Yes
Attractive, compact aluminum case	Yes	Yes
Two built-in phone connectors	Yes	**No**
Compatible with The Source and Dow Jones News Retrieval	Yes	Yes
Unattended remote test capability	Yes	**No**
Phone cable included	Yes	Yes
Availability	Now	
Price	**$499**	**$599**

The Ven-Tel 1200 PLUS offers high speed, reliable telecommunications for your personal computer or terminal. Whether you use information services or transfer data from computer to computer, the Ven-Tel 1200 PLUS is the best product around. Available at leading computer dealers and distributors nationwide.

Also from Ven-Tel: internal modems for the IBM and HP-150 Personal Computers with all of the features of the 1200 PLUS.

You choose. The Ven-Tel 1200 PLUS—the smartest choice in modems.



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